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Uncovering presence: What adult participants say enhances instructional videoconferencing

Ellis, Michael Eugene, Ph.D.
The Ohio State University, 1993

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Uncovering presence:
What Adult Participants Say Enhances Instructional Videoconferencing

Dissertation

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Michael E. Ellis, B.A., M.A.Ed.

* * * * *

The Ohio State University

1993

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Advisor
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Dedication

This project is dedicated to my wife, Janet, for being the ultimate encouragement and support in a process filled with emotional highs and lows. Her undying love and continued belief in me shines as brightly as any star in the heavens. I pray she is rewarded by any benefits this project will have on our lives, for she is the one that truly sacrificed. This project is also dedicated to my son Thomas, who also paid a high price for my being in school during many of his formative years. I pray he has learned from my experiences and will develop in himself an attitude that looks forward to challenges and meets them directly.
Acknowledgments

Without the help of my advisor, Dr. Steve Acker, and my committee members, Dr. Thom McCain and Dr. Marge Cambre, this project would never have come to completion. Their insights, critiques, and helpful admonitions have lifted this project to a higher level. My gratitude is extended to each of them for their ability to shed light on difficult concepts, their help in meeting deadlines, and their general support in a long work. My special thanks are extended to Steve for going the extra mile in his time, council, and assistance in helping me sift the chaff from the grain.

Acknowledgements are also extended to the College of Agriculture for their desire to press forward in the search for better approaches to learning. To the administrators, faculty, staff, and students who participated in this project, thank you. You were a constant source of energy for this project.

Any shortcomings in this project are not attributable to the college, my committee, or any source except the author. My own weaknesses are a constant reminder to me of how truly human I am. Finally, any insights or inspirations I received or are rendered by the reading of this document are attributable to God, since He is the source for all that is good. Thank you, Lord, for loving me and responding to my needs and requests. Help me to push past my weaknesses and inspire others now and in the future.
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Distance Education -- Steve Acker, Thom McCain, Marge Cambre
Critical/Cultural Studies -- Brenda Dervin
Rhetoric -- Sonja Foss
Interpersonal Communication -- Don Cegala
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Uncovering Presence: What Adult Participants Say Enhances Instructional Videoconferencing

By

Michael E. Ellis, Ph.D.
The Ohio State University, 1993
Steven R. Acker, Ph.D., Advisor

Instructional videoconferencing using two-way audio/full-motion video offers a potential high-growth vehicle for universities and colleges because of its ability to supply courses over large geographic expanses, to lower travel costs for faculty, and to allow learners to attend courses in spite of multiple responsibilities and limited available time for course work. However, the diffusion of 2-way instructional videoconferencing has not kept pace with prognostications. One explanation for this is in the acceptability of videoconference-delivered courses based on the quality of the educational experience from the perspective of the participants. This dissertation identifies specific technological, sociological, and pedagogical concepts as important communication factors that influence the educational experience for 2-way videoconference participants and are related to student acceptance of the delivery mode. Specifically, the concepts of adaptation of adult learners, affect related to technology systems, and presence as mediated by the various elements of a technology system are brought out as highly important factors related to this case study.

ix
Abstract

Instructional videoconferencing using two-way audio/full-motion video offers a potential high-growth vehicle for universities and colleges because of its ability to supply courses over large geographic expanses, to lower travel costs for faculty, and to allow learners to attend courses in spite of multiple responsibilities and limited available time for course work. However, the diffusion of 2-way instructional videoconferencing has not kept pace with prognostications. One explanation for this is in the acceptability of videoconference-delivered courses based on the quality of the educational experience from the perspective of the participants. This dissertation identifies specific technological, sociological, and pedagogical concepts as important communication factors that influence the educational experience for 2-way videoconference participants and are related to student acceptance of the delivery mode. Specifically, the concepts of adaptation of adult learners, affect related to technology systems, and presence as mediated by the various elements of a technology system are brought out as highly important factors related to this case study.
Chapter I

Instructional Videoconferencing: A Problem Statement and Literature Review

Problem Statement

How can colleges and universities provide valued education to nontraditional students in a cost effective manner? Today, one possible answer is two-way videoconferencing. However, this answer is only useful if the educational experience is considered valuable by those users of this new course delivery medium.

Two-way videoconferencing is being used to supply courses over a distance to meet the demands of educational institutions to save money, distribute expertise, help facilitate equity in departmental and instructor responsibilities, and allow quality education for nontraditional students. However, student acceptance or user demand is a necessary condition for two-way videoconferencing to succeed and little has been done to allow student input to affect this technology design. This dissertation provides a case study of instructional videoconferencing in an adult educational setting. In the process, this research (1) examines communication factors related to the needs of adult participants in instructional videoconferencing and (2) offers a direction for designing instructional videoconferencing appropriate to meet those needs. The principal research question driving this study is: how can an interactive instructional
videoconference be made more successful from the perspective of the users of the system?

**Philosophy and Theory**

Conceptually, the area of instructional videoconferencing offers an interesting convergence of three areas of study. First, videoconferencing, since it is an activity involving groups of people, offers a unique phenomenological experience embedded within a specific social setting. Videoconferencing must be viewed as a sociological event. Second, since videoconferencing involves new and emerging communication technologies, the setting demands that communication theory play a role in the understanding of the development of the social system from a technological/sociological perspective. Finally, when videoconferencing is used to allow individuals to participate in education, the peculiar considerations of the education process are brought to bear on this already unique environment. Sociology, communication, and education must work in conjunction to inform a holistic understanding of the instructional videoconferencing environment.

The following is a brief outline of macro-concepts driving the approach to studying how an interactive instructional videoconference be made more successful from the perspective of the users of the system. These concepts are derived from researchers in sociology, communication, and education. This foundational material is provided so that the analysis of the micro-system of instructional videoconferencing can be understood from a theoretical and philosophical point of view.
First, what constitutes a social event? Schutz (1967) believed that people are understood through the everyday life-world. Individuals, as a regular function of daily life come together, meet, interact, and some consequence is created in their interaction. To use Schutz's terminology, social action takes place and the occurrence of this action is what makes the study of social settings interesting. In the specific instance of two-way videoconferencing used in the classroom (heretofore referred to as instructional videoconferencing), the questions of relevance to sociology relate to the processes of coming together and the resulting sequences of activity.

To implement this philosophy or approach to sociology, a theory of action must be defined. Husserl (1931) laid a groundwork for this perspective of social science by saying that action is the translation of abstract ideas and meaning into more concrete, external expressions. Action is a purposed response to a person's encountering a unique set of circumstances—the carrying out or playing of a role for some purpose in a specific situation. Argyris and Schön (1974) extended Husserl's notions to provide the proposition, "In situation s, to achieve consequence c, do action a. From the perspective of the agent who holds the theory, it is a theory of control" (quoted in Argyris, Putnam, & Smith, 1985, p.81). Consequently, a key component of action theory is the notion of control.

Argyris, Putnam, and Smith (1985) see this theory of action and control having relevance because of the implication that people operate with some type of predictive frame. This predictive frame can be an espoused theory of action or it may be a theory-in-use and it may or may not be consistent within an individual. A person may state s/he would act in a particular manner under certain
circumstances, but when those circumstances are encountered, the person may not follow their espoused theory but act on their theory-in-use. The individual employs an action strategy believed most appropriate to achieve a desired outcome in a given situation.

Argyris, Putnam, and Smith (1985) define these action strategies as "sequences of moves used by actors in particular situations to satisfy governing variables" (p.85). Untold combinations of individual actors and governing variables make for an endless source for inquiry. What makes the study of these actions interesting is that "actions have consequences for the behavioral world, for learning, and for effectiveness" (p.85). The behavioral or social world, learning and education, and effectiveness and the communication process necessary to bring about change offer a rich integration of knowledge and insight. One concept which seems consistent within the three areas is control.

Control is a key element in communication theory according to Beniger (1984). He believes that a control revolution has lead to the development of the current state of communications in the world. Because actors are seeking greater control over communication and the manageability of information, new and different communication technologies are created to provide this control. The object of the control is more power, resources, or both. Thus, the specific setting of instructional videoconferencing exists as a peculiar social phenomenon because it fulfills a function of power and control.

Beniger’s notion of mediation for the purpose of control is similar in function to Aristotle’s own view of communication and the reason to employ it. Both Beniger and Aristotle view communication as a means for bringing about a
desired end—a theory of action put into practice through the process of communicating. For Aristotle, communication is a means to gain influence over other individuals through argumentation and persuasion. In media research this end is often referred to as effect. With instructional videoconferencing, the minimum desired effect is to facilitate the learning process. Thus, control can be viewed as an effect measurable for students, instructors, and administrators by determining who has power in the instructional process over curriculum, question and answer periods, and media-specific items such as shot content.

For educational theorists, the notion of control and effect is also an important consideration. Freire (1970) believed the ability of large institutions (i.e. governments, religious orders, etc.) to suppress or control the actions of the populace was a function of the educational norms supported by those institutions. Freire theorized that teachers/facilitators of a group of learners can bring about the group's conscientization (Friere's term) or enlightenment. In other words, Freire viewed control as a concept that is regulated through higher levels of awareness brought about through literacy, critical thought, and skills obtained through the education process—something he viewed as inherently communicative. The theories and ideas from one field points back to another.

Consequently, applying the theories and concepts of sociology, communication, and education is not a stretch, but already may be linked in Schutz's everyday life-world. The specific theories and philosophies of sociology, communication, and education that work implicitly and explicitly in this study, then, are those that affect the individual's state of being in the world. Through the complicated workings of social groups building new technologies for the purpose
of controlling others around them, the researcher can begin to assess value in that social setting based on the direction of the control and efforts made to enlighten the participants who may come into contact with this setting. Consequently, one cannot study a system such as instructional videoconferencing in isolation, but as the result of convergent forces within a larger social world.

McCain (1992) brings these forces into focus for media studies when he writes that the interplay of technology systems, the policy makers and institutions, and the marketplace determine what survives and what passes away into oblivion. Instructional videoconferencing, then, is the end result of interactions among the larger social forces of technologies, policies, and users (or markets). These areas collide, collaborate, or otherwise come together to form a social situation that can be challenging or enlightening. The approach taken in this study is to allow the intersection of these three large social domains of technologies, markets and policies to provide insight into what many view as a chaotic technology system—a system with little order or design. By organizing the theory and philosophy around this intersection, the chaos can be ordered to bring useful information to those studying the setting.

Unfortunately, many researchers and research methodologies that are employed to help uncover these intersections and complexities share one fundamental major weakness. According to Geertz (1983), most lack insight because they rely on describing the result of a process as opposed to the processes that lead up to the results. This is one basic objective driving this study—understanding what the processes are that lead up to a particular set of results in the instructional videoconferencing setting. Thus, the following literature review
is an exploration of sociology, communication, and education perspectives to allow for the sorting, examination, ordering, and understanding of the processes that contribute to a positive end result for the participants in an instructional videoconferencing setting.

Literature Review

The use of technology-mediated, long-distance educational practices has increased dramatically over the past decade (Adams & Hamm, 1989; Arger & Jones, 1990; Brown, 1988; Kromholz & Johnstone, 1988; Purdy, 1986). This increase has been so dramatic that the field has earned its own label of distance education or distance learning. Distance education is characterized primarily by a separation of student and instructor (Wilkinson & Sherman, 1991). Instructional videoconferencing is simply one mediating technology used within distance education.

Videoconferencing uses one-way or two-way video and some form of two-way mediation. Typically, a one-way videoconferencing setting uses a telephone line to facilitate two-way interaction in real-time, but facsimile (fax) machines, electronic mail, and even regular postal mail are also used. The form of videoconferencing studied in this project used two-way audio and two-way video to link instructors physically separated from their students. This form of videoconferencing is different from other technology-mediated learning mechanisms such as videotape-based telecourses, computer-assisted instruction, or interactive videodisc, in that this medium does not rely as much on self-directed, independent learning strategies, but implicitly functions on the principal that people desire interaction with other people.
Presently, several factors argue for more research in instructional videoconferencing. These factors are 1) increased likelihood of institutions of higher education gradually escalating the number of distance-education efforts (Bates, 1988; Dede, 1990), 2) the relative cost effectiveness of these programs (Johnstone, 1991; McCain & Acker, 1990), and 3) the need for more original research that deals explicitly with the intrinsic and extrinsic factors related to interactive media (Acker & Levitt, 1987; Bretz, 1983; Hortin, 1988). Since 2-way instructional videoconferencing’s orientation is unique in relation to other forms of distance education, more original research dealing specifically with 2-way instructional videoconferencing design and usage is necessary.

Schools are attempting to incorporate distance learning to accomplish several goals. First, many students who wish to enroll in specific courses are separated by significant distances from the experts who are qualified to provide the type of instruction these students need or want (Kitchen, 1992). In order to meet the need, schools that cannot afford to bring in a person to serve a sparse population in a full-time teaching position elect to bring the person to the school via mediating technologies (Mangan, 1991). This allows students that cannot leave a geographic locale because of family, jobs, and other barriers to still receive an education they need and/or desire.

Second, institutions are just beginning to market these technological advances in order to draw new students to education. Dede (1990) predicts an eventual implementation of technology-mediated interactive learning for topics requiring high levels of instructor expertise as the primary choice of delivery and not simply as a means to overcome otherwise insurmountable problems. Areas
such as medical specialties, engineering sub-fields, and psycho-social fields where
an instructor has a public reputation are all seen as potential users of
videoconferencing in this way. Although Egido (1990), Gayeski (1989) and
Heller (1989) point out that instructional videoconferencing has not penetrated as
quickly as originally anticipated by the technology prophets, there still is a
significant potential for future implementation in academic settings (Swift, 1988;

Third, telecourses and instructional videoconferencing offer an alternative
that could bridge time problems and at the same time maintain quality of learning
(Barney, 1990). The ability of students and teachers to shift time and space
requirements allows individuals to participate in courses who could not do so
otherwise. Traditional courses are constrained to meet at a particular place at a
particular time. Instructional videoconferencing affords both faculty and students
the opportunity to be at different places at various times. A videoconferenced
course allows there to be two sites or as many as needed, depending on the
delivery system employed. People from around the globe have the potential to be
enrolled in a single class together. If asynchronous conferencing were employed
(where an audio/video signal is sent out at one time and the receiving end replies
at a different time), then ability to shift time according to the needs of the
participants is also possible. Even in synchronous 2-way instructional
videoconferencing, more opportunity exists for flexibility because of the ability to
schedule courses at off-peak times and the potential for some students to be
involved with broadcasts closer to home(or at home in the future using digital
compression technologies).
These are compelling reasons to continue with more research, but instructional videoconferencing raises certain questions that have yet to be answered. Does videoconferencing offer opportunities for equal or better educational experiences than face-to-face? Is there a cutting-edge approach to the learning process facilitated by instructional videoconferencing that has yet to be explored? How complicated does the technology make the learning process for both the student and the teacher? The unanswered questions require that researchers begin looking to what stands out as unique about the system.

Instructional videoconferencing is unique in that this approach to learning incorporates technologies previously reserved for broadcast purposes. Because broadcast technologies are applied to an interactive setting, there are potential problems that should be heeded by instructional design teams and users of the instructional technology. Regrettably, designers of these systems are often unaware of the fundamental constructs that may dictate final usage (Acker & McCain, 1992). Even when users are aware of the potential problems, they still may not be conscientious users of videoconferencing technology (Brown, 1988). Thus, the researcher needs to examine videoconferencing in such a way as to allow the complexity of the system to be examined.

The Questions

Finding out what adults think are the important communication elements of a videoconference is a complex task. The mystery can be unraveled, but the answer must be presented within a particular context. This study explored an existing, functional instructional videoconferencing setting used in the on-going delivery of graduate and undergraduate courses. This system had been in
operating for the past six years is used to get beyond initial start-up problems and issues and ascertain the true priority issues in the design and use of instructional videoconferencing environments.

Exploring videoconferencing from the perspective of the users of the system leads to at least three other questions. First, what affect and perceptions do participants in for-credit instructional videoconferencing courses attach to the usage of this mediating technology for learning? Second, what do the participants in an instructional videoconference feel should emerge as the most important constructs for evaluation of these courses? Third, what do observations of verbal and nonverbal communications during a videoconferenced class reveal about the participants and instructional technology design?

An assumption that leads to the above questions is that the adult participants in a videoconferenced course are the ones who know best what they like and dislike. This does not imply that the students would be more familiar with content or analytical skills, but they would know what makes them attend to instruction and what motivates their interests. Likewise, the instructors would be the ones who know best their own reactions to the medium and to the processes bound up in the medium. This is in contrast to much of the literature in instructional technology where a designer assumes that s/he is best suited for attending to the significant factors without regard for the particulars of the course or its participants (Arnall, 1987; Johansen, 1984). Flagg (1990), Reinharz (1992), and Weisner (1983) argue that the place to begin when evaluating social settings in general, and learning technologies for adults, specifically, is with those using the innovations. By understanding the key issues of instructional
videoconferencing, asking questions relevant to the specific setting, and considering the input from users of instructional videoconferencing technology, one may reduce the confusion surrounding instructional videoconferencing systems design and use (Herschfield, 1987).

**Instructional Videoconferencing Design**

In answering the question, what are the salient communication factors in successful instructional videoconferencing, design and pedagogical/andragogical practices in instructional videoconferencing stand out as the primary considerations. Distance education design has been trapped in a loop that does not consider the unique circumstances that surround distance education (and instructional videoconferencing, specifically) from other forms of mediated communication (Adams & Hamm, 1989; Castro, Stirzaker, Norcott, & Basich, 1986).

Typically, instructional designers developing a videoconferencing system have borrowed techniques from traditional broadcasting (e.g. Bates, 1988; Bohm & Templeton, 1984; Cowan, 1984; Price, 1991; etc.). As a response to this thinking, Acker and McCain (1992) argue that “electronic meetings are handicapped if approached from a broadcasting perspective” (p.8). The usual practice of transmitting a message unidirectionally to an indeterminate audience disregards interaction required by many students (Kitchen, 1992; Kruh & Murphy, 1990; Darkenwald and Merriam, 1982). Certain broadcasting production standards may not be necessary with an environment that requires a different media aesthetic (Zettl, 1990), and education may be an area where such a different aesthetic may apply (Acker & Levitt, 1987). Finally, distance educators
must challenge the notion that delivery of education to ever growing audiences equates to more effective education (Carl, 1986). Size of the student population in a course may affect how those students view the relative value of the course and their overall ability to learn in a particular setting.

Borrowing from Bretz (1983), there are two possible goals to be pursued by those who design teleconferencing systems, those two goals are “(1) to simulate, within the limitations of the medium, the experience of face-to-face communication, and (2) to go beyond the possibilities of face-to-face meetings and develop new kinds or dimensions of communication” (p. 174). These goals lead to an examination of what constitutes face-to-face interaction and what mediation through a videoconferencing system does to those interactions. Proxemics, sensory selection, and aspects of nonverbal and verbal communication all contribute to understanding how to achieve these goals and lead to a concept called "social presence" (Short, Williams, and Christie, 1976).

Presence

Presence is a concept that is not new to social and communication theory. One can trace the development of the theoretical construct of presence to Aristotle’s discussion of metaphor and what he calls "bringing-before-the-eyes." An example that Lawrence (1993) uses to illustrate this concept is the war on drugs metaphor. The war on drugs "makes present the conditions for the possibility for the curtailment of civil liberties" (p. 3). In other words, the associated commonplaces of war (threats to national security, savage enemies (drug dealers), threats to our borders (smuggling)) become present, that is, active, through the metaphor.
In the 18th century, George Campbell (1776) believed that presence was a fundamental element of rhetoric and was made up of conditions of time, place, connection, and personal interest. These components of presence, if developed adequately, would raise a reality from abstraction and obscurity to a prominent level of attention. Campbell inspired others to extend ideas of what constitutes presence. One of those inspired by Campbell, at least in part, is Chai’im Perelman.

Perelman (1982) quotes a Chinese tale told by Mencius to illustrate the effect of presence:

“A king sees an ox on its way to sacrifice. He is moved to pity for it and orders that a sheep be used in its place. He confesses he did so because he could see the ox, but not the sheep [Pauthier, 1852].”

Presence acts directly upon our sensibility. The presentation of an object—Caesar’s bloody tunic as brandished by Antony, the children of the victim of the accused—can effectively move the audience or the jury. But the effective presence can also lead to problems in that it not only can distract the audience but can also lead them in a direction the speaker did not intend.

But there is more. The techniques of presentation which create presence are essential above all when it is a question of evoking realities that are distant in time and space. This is why it is important not to identify presence as we conceive it, which is presence to consciousness, with effective presence. (p. 35)

Perelman continues the argument when he quotes Bacon’s view of why presence is such a powerful concept:

The affectation beholdeth merely the present: reason beholdeth the future and the sum of time. And therefore the present filling the imagination more, reason is commonly vanquished; but after that force of eloquence and persuasion both made things future and remote appear as present, then upon the revolt of the imagination reason prevaileth. (p. 36, quoting Bacon, 1944).
Perelman was firmly rooted in the notion that without presence, an individual could not be forced to call into question an argument. He writes in *The new rhetoric and humanities*:

> Things present, things near to us in space and time, act directly on our sensibility. The orator's endeavors often consist, however, in bringing to mind things that are immediately present...

To make 'things future and remote appear as present,' that is, to create presence, calls for special efforts of presentation. For this purpose all kinds of literary techniques and a number of rhetorical figures have been developed. Hypotyposis or demonstratio, for example, is defined as a figure 'which set things out in such a way that the matter seems to unfold, and the thing to happen, before our very eyes.' Obviously, such a figure is highly important as a persuasive factor. In fact, if their argumentative role is disregarded, the study of figures is a useless pastime, a search for strange names for rather farfetched and affected turns of speech. Other figures, such as repetition, anaphora, amplification, congerie, metabole, pseudo direct discourse, enallge, are all various means of increasing the feeling of presence in the audience. (pp. 17-18)

Clearly, Perelman believed that without bringing an object, argument, or individual into the current time and space, then the ability to have an effect on others is lost. Perelman saw presence as a result of language, but others have taken a broader view of the concept. One of these individuals is Merleau-Ponty.

Merleau-Ponty has brought presence into the fore from a slightly different philosophical thread as a fundamental construct for theory development. In an attempt to make philosophy into a more rigorous science, Merleau-Ponty (1962) describes phenomenology as the study of essences, essences that revolve around “an inalienable presence” (p. vii). Merleau-Ponty sees presence of an object or person emanating from perception disassociated with comprehension. This perception, in turn, creates a problem for the individual experiencing the presence:

Perception is a judgment, which, however, is unaware of the reasons underlying its own formation, which amounts to saying that the perceived
object presents itself as a totality and a unity before we apprehended the intelligible law governing it...

The task for the scientist becomes one of being aware of the laws of governance as they relate to the experienced. Although something or someone is totality present in person, we cannot fully understand how this can be until we first understand how we ourselves are present.

As presence became a construct that moved out of strictly rhetorical or philosophical realms, the notion began to be more closely associated with a process of mediation. Goffman (1959) developed the fundamental aspect of presence as being a mediated construction; we are able to control our presence. Goffman saw presence as the result of an intentional or unintentional encounter with another person where the encounter has some kind of influence on that other person. He labeled these activities as performance, front, dramatic realization, maintenance, misrepresentation, mystification, reality and contrivance. In other words, all life is a stage and we are its actors.

Though the analogy may be overworked, Goffman established presence as being controllable and we as the presenters or actors are the ones who do the controlling. Presence to Goffman was not just an unavoidable aspect of the human condition, presence permits illumination. “While in the presence of others, the individual typically infuses his activity with signs which dramatically highlight and portray confirmatory facts that otherwise might remain unapparent or obscure” (p. 30).

Bruno Latour (1986) has taken the idea of mediated presence and extended it even further. To Latour, presence is something that can be constructed, but it does not need to take place in a face-to-face setting. Presence may be mediated
by the map a cartographer has devised, by the brickwork laid in rows by the mason, or by any other creation of individuals. According to Latour, presence is when a portion of the individual is left in the work. Consequently, one is able to experience the presence of the person long dead if there is some artifact, some momento still available to see, hear, smell, taste, or feel. Latour's ideas come out of his work on studying the development of knowledge, the art and politic of science.

Presence as described by these theorists is argument, phenomenon, interaction, constructed reality, essence, and perception. Placing these terms in some type of coherent form, the result is to say that presence is the result of an event (phenomenon) where two or more individuals are brought into contact with one another through the process of attending to particular perceptual realities—the product of which generates an essence or experience greater than these individual elements alone. This definition of presence allows for both face-to-face and mediated interactions, but it does not say that these differing forms of presence yield the same essence.

As presence is applied to mediated settings, Short, Williams, and Christie (1976) in their book The Social Psychology of Telecommunications help to provide a more concrete understanding of what constitutes social presence. They describe social presence in a mediated setting:

"as being a quality of the communications medium...a quality of the medium itself...We conceive of Social Presence as a single dimension representing a cognitive synthesis of all the factors discussed in Chapter 4 (Argyle's (1969) six functions for non-verbal cues—mutual attention, channel control, feedback, illustrations, emblems, interpersonal attitudes; plus the factors of proximity and orientation; physical appearance; dynamic arm and trunk signals; facial signals; eye-gaze—author) as they are perceived by the individual to be present in the medium. Thus, the
capacity to transmit information about facial expression, direction of looking, posture, dress and non-verbal cues, all contribute to the Social Presence of a communication medium" (p. 65).

They see different media inherently having differing levels of social presence. However, they do not see social presence as something that is perceived the same with every individual.

"We conceive of Social Presence not as an objective quality of the medium, though it must surely be dependent upon the medium's objective qualities, but as a subjective quality of the medium. We believe that this is a more useful way of looking at Social Presence than trying to define it objectively" (p. 66).

This view of social presence allows for researchers to begin exploring the various dimensions of social presence for various media.

When Bretz (1983) claimed that one possible goal of videoconferencing is to simulate face-to-face encounters as closely as possible, in practice it is this element of presence that he is discussing. One of his primary operationalizations of presence was in terms of perceived proximity. Applying Hall’s (1966) taxonomy of proxemics, Bretz believed that videoconferencing could be made more like a face-to-face encounter if designers of videoconferencing systems would consider the camera-monitor-subject relationships. By increasing/decreasing monitor size, moving chairs closer to or further from the monitor, allowing the camera to use a wide or tight shot, all affect how a videoconferencing scenario will be experienced. If the setting being examined were simply videoconferencing, then work on achieving the goal of approximating face-to-face encounters or creating a more personal social presence could stop at this point, but the environment in question here is the instructional
videoconferencing setting. Interaction in a classroom setting carries with it another level of expectation for all participants in the form of learning objectives.

**Learning Objectives**

Instructional videoconferencing introduces another set of expectations that developers and users must consider—achieving learning outcome objectives. What are the philosophies guiding the facilitators and the learners? Are outcomes to be tangible and measurable, or is the facilitator attempting to realize goals that are more abstract, long-term, and harder to measure? The setting of objectives for education is a debated topic, but most educators agree that some expectation will be established prior to the initiation of a course. Thus, instructional videoconferencing carries with it the goals of simulating the face-to-face interaction as best as is possible, going beyond the face-to-face interaction to take advantage of the unique aspects of videoconferencing, and bringing the advantages of the technology into the setting for the purpose of achieving certain predetermined outcomes for the participant.

Because of the need to understand how the videoconferencing system recreates the face-to-face interaction, several specifics of media design need investigated. These include time utilization, staging, shot selection, turn-taking, lighting, camera-monitor-subject relationships, and audio management (Acker & McCain, 1992). These factors contribute to the realization of achieving the overall success of a videoconferencing experience.

**Time Utilization**

Time utilization is quite dependent upon the material being discussed and the type of respondents involved in the videoconference. When approached from
a broadcasting perspective, the prevalent idea is to use the time as efficiently as possible (Barney, 1990). The goal is to deliver a message to as many people as possible in the shortest amount of time necessary. Typical suggestions are to develop scripts, have all visuals prepared in advance, provide audience members questions in advance, and other time-saving efforts (Bosner, 1984; Cowan, 1984; Morris, 1991). This perspective views the role of technology and of television as a mass medium. Ironically, in instructional videoconferencing, this very notion is challenged in that there are parties present at two or more sites. Yet, there are those who practice this approach to videoconferencing and seem to disregard the inherent interactivity available to the system.

However, Acker & McCain (1992), Schwier (1987), Kraus & Fussell (1990), and Kruh & Murphy (1990) see interactivity as an important aspect of time utilization. If interaction is allowed to develop naturally, it necessarily deviates from a pre-scripted exchange and alters the nature of the communication. Therefore, understanding how a videoconferencing network approaches time utilization illuminates what the designers and users feel is philosophically more important—information exchanged or information given.

If design teams see interaction as important, the type of interaction that is deemed important may still differ both quantitatively and qualitatively. What is the nature of the interactions taking place in a particular instructional videoconferencing setting? What is the relative importance of those interactions to the participants of an instructional videoconferencing course? How are those interactions helped or hurt by the nature of the course design and structure?
Interestingly, interaction has become a topic of some debate in the circles of distance education (Moore, 1991).

In this debate, some have said that interaction is a form of hype in order to obtain more dollars for distance learning endeavors (Bangkok Project, 1992) or that interaction is simply an overstated concept that proves unnecessary in real settings (Baldwin, 1991). Those that argue that interaction is not necessary typically take a position that education is an information delivery process. Experts pour information into student receptacles who, in turn, present that information in the form of answering exam questions. They argue that interaction is not necessary because each study that compares traditional courses and mediated courses shows no significant difference in achievement scores (See Acker & McCain, 1993, however). In contrast, many others suggest that interaction is critical to the success of a mediated course (Carey, 1991; Hawkins, 1991; Hult, 1988). These authors suggest that the degree of interaction, type of interaction, and medium of interaction may all influence how learning is realized. Their argument is that learning is more than recitation. Areas such as affect, attitudes, and critical thinking skills are seen as important end results of education but are typically not measured or are considered immeasurable.

Consequently, researchers and designers in an instructional videoconferencing setting need to be aware of the potential for interaction (or lack of interaction) to not only help, but also to hinder the learning process. Finding out how and when interaction contributes to the learning process in a mediated environment is context and student dependent, not a "main effect" variable. Sometimes, interaction is discussed with respect to interpersonal communication
related to staging, turn taking, proxemics, and immediacy. These concepts are discussed in more detail later in this chapter.

**Lighting**

Lighting, the second of the initial design concepts, is important because users and designers of instructional videoconferencing systems can determine the simple visibility of participants at either end of a videoconference as well as create specific moods and appearances. This ability to evoke connotative meanings from the setting limits the amount of variation permitted in a nondramatic performance (Zettl, 1990). However, practical concerns such as the fall of shadows on participants, shallow glare angle, the lack of lighting to capture an image, and the ability to view certain visual supplements all must be considered when evaluating the overall impact and relative effectiveness of an active instructional videoconferencing setting. Poor lighting conditions can generate negative reactions from the participants in an active instructional videoconferencing (Canelos & Carpenter, 1984; Finn, 1984; Hansford & Baker, 1990), may limit the amount of interaction by limiting turn-taking cues and the attentiveness of the participants (Price, 1991), and otherwise disrupt the proceedings of a videoconference (Gerakis, 1989). Acker and McCain (1992) recommend a diffuse, overhead lighting that closely simulates natural lighting. Some producers of instructional video recommend more traditional main and key lights, while others see this environment as offering an opportunity to use innovative approaches such as high intensity single lights and halo lighting for the purpose of accentuating certain elements or simply as attention getting devices (Lund & Warren, 1992).
Regardless of orientation, adequate lighting is a major component of the video image. The researcher that is investigating an active instructional videoconferencing setting should be concerned with the particulars of how the lighting is arranged. Regrettably, this particular design issue is often only a design function. Once in place, users may be hesitant to change a videoconferencing set (Hawkins, 1991). If this is the case in an instructional videoconferencing experience, then considering how the participants have adapted to the setting must be understood.

**Audio Management**

Audio management in an instructional videoconferencing setting should approximate a face-to-face interaction by allowing directional determination. Also, the ability for participants to discriminate between several respondents and to perceive subtle changes in tone and pitch of these respondents is considered important (Hansford & Baker, 1990; Hawkins, 1991). Sound reproduction at a minimum hinges on the delivery system, type and placement of microphone, the pattern and reproduction of the microphone, vocal characteristics of the participants, sound qualities of the room, level control--be it automated or manual, and sources of noise in the system such as feedback or foldback.

All of these factors contribute to clarity of the sound, the most important element of instructional delivery in a two-way interactive environment; even more important than the overall video production (Stanley-Muchow & Poe, 1989). Again, the researcher evaluating or exploring an active instructional videoconferencing setting must concern him/herself with the specifics of the audio management process--the relative effects of the audio for the participants
and how those results were obtained. This is not because of the mechanics or physics of the setting, but because of the need to understand how to simulate the face-to-face experience and improve intelligibility.

**Staging.**

Staging is another design area deserving careful study, but may involve substantial cost related to background design and furniture selection. The appearance of the room and the arrangement of the participants in the videoconferencing studios all play a part in creating affect. What seems to confound this aspect of videoconferencing design is that recommendations for what should be done are dictated by differing philosophies of design.

Price (1991) views the room as important, but advocates designs that allow for column and row designs resembling a traditional large lecture classroom when designing two-way interactive audio/video systems. In contrast, Acker & McCain (1992) suggest that this type of videoconferencing environment is best suited to an equi-center design philosophy. According to the equi-center approach, participants in the videoconference ought to be roughly the same distance away from the cameras and monitors being used in the instructional videoconferencing setting. These competing and seemingly contradictory philosophies are examples of how the research in videoconferencing staging is still in its infancy. The researcher examining an instructional videoconferencing setting must consider how the placement and positioning of the students, the backgrounds of the send and receive shots, as well as any other props, furniture, monitors, and other paraphernalia in the instructional videoconferencing setting.
affect the shot content and how that shot content affects the reactions and interactions of the participants.

Shot Selection

Shot Selection is another of the complex concepts for instructional videoconferencing design. Broadcasting standards have created certain expectations for those watching television (Wurtzel & Acker, 1989; Zettl, 1984). Wide shots versus tight shots, camera operators using the rule of thirds versus allowing the participants to select shot content, computer graphic overlays versus the instructor using the chalkboard for a shot are all examples of decisions that must be made in the design and implementation phases of the instructional videoconferencing experience (Acker & McCain, 1992; Wurtzel & Acker, 1989; Zettl, 1990). Shot selection can influence what participants register as affect and connotative meanings from the other participants (e.g. Cohen, 1984).

Whose image is chosen from a larger group to be sent as a close up? Who makes these decisions? How does the composition of the image lead to a particular perception on the part of the viewer? Shot selection can lead to varying perceptions without needing to change anything else in the environment.

Since shaping the emotions and communication messages of the participants is directly related to shot selection, researchers and designers investigating an instructional videoconferencing setting must pay attention to several factors. Who has control over the shot selection? How are these decisions made? How often does the shot selection change during interactions? Do participants seem to connote anything from the shot selection? Do the participants feel hindered or helped in the interactions with participants at another
Turn taking

Turn taking is an aspect of the instructional videoconference that relates to interaction. The issue here is in determining how participants know when to ask questions and when to remain silent. What visual or verbal cues are provided for the participants? Does the facilitator and the physical facility encourage spontaneous questions? If so, do the students take advantage of this opportunity? If not, why not? Another concern is again in the physical design of the studio. Does the audio management hardware permit talk-over that would more closely resemble a traditional classroom setting? Do nonverbal or paralinguistic aspects of interpersonal communication cue the students as to what times are appropriate for questions or comments?

The question, then, is to determine what contributes to students feeling encouraged to participate in discussion during a class. One construct that has been tied to the process of interaction in the traditional classroom is teacher immediacy—the ability of a teacher to convey to the students that s/he is approachable and wants to interact with the students (Kearney, Plax, & Wendt-Wasco, 1985). In a two-way audio/video conference, the question becomes, how does the technology allow for immediacy to be transmitted to participants at the other end(s)? Gump (1985) points to classroom design as a contributor to positive teacher immediacy and turn-taking ease; bringing in the previously discussed
notion of staging. Others have related turn-taking to proxemics in a mediated classroom (Bretz, 1983) and the specific constructs (like camera-monitor-subject relationships) that lead to the presentation of certain proxemics (Ellis, 1992b).

Therefore, one of the key areas for investigation in an instructional videoconferencing setting is with respect to this notion of turn-taking. However, this concern may relate to perceptions about turn taking and not the actual turn taking itself. The possibility exists that students may not actually need to be participating in the discussion or taking turns with the facilitator and other students, but that the perception of being able to participate if s/he desired to do so is more important to the overall satisfaction of the student.

**Camera-monitor-subject relationships**

Camera-monitor-subject relationship deals with simple design decisions that may have large implications. Camera-monitor-subject relationship refers to the placement of the imaging camera, viewing monitor and participants in the instructional videoconferencing setting. Considerations include camera angles, monitor viewing angles, monitor sizes and color rendition, subject distance from cameras and/or monitors, and the interaction of these elements together. When the camera-monitor-subject relationship is operationalized in conjunction with decisions of shot content, the result is what Bretz (1983) calls the perceived proxemic distance (PPD).

According to Ellis (1992b), PPD may be an important element that shapes attitude development and content retention in a typical instructional videoconferencing classroom setting. Hall's (1966) taxonomy of proxemic distances may be applicable in a mediated setting as it is applied in a traditional
face-to-face meeting. Therefore, another simple manipulation may significantly alter the overall effect of an instructional videoconferencing course. Because of the potential for great change to be brought about by seemingly minor shifts in camera-monitor-subject relationships, the researcher is obliged to consider this factor when analyzing the instructional videoconferencing setting.

Acker and Levitt (1987) suggest that a Gazecam (a camera-monitor set up that uses mirrors to perfectly align eye gaze) be used to provide direct eye contact between videoconferencing participants. This one aspect of camera-subject-monitor relationships requires techniques out of the ordinary for typical videoconferencing locations, but is technology that has been used for quite some time in the broadcasting industry for applications such as teleprompting.

Of these potentially manipulable constructs, the elements of shot selection and camera-monitor-subject relationships seem to be the most easily varied and flexible. Since changing these elements doesn’t require added equipment, cost does not enter into the discussion when considering changes or improvement. Conceptually, these two function as operationalized components for simulating the face-to-face experience more adequately. They carry the combined potential of little expense yielding large effects such as greater satisfaction by the participants and the ability to attend more carefully to the interactions as they take place.

**Instructional Strategies**

Another factor of instructional videoconferencing design that is key to research and exploration in instructional videoconferencing is instructional strategy. Does the technology introduce any unique factors related to the
experience of learning? Some have suggested that instructional strategy remains essentially the same as the traditional large lecture class environment. In other words, the instructor feeds information to the students as consumers of "truth" without need for interaction (Canelos & Carpenter, 1984; Florini, 1989).

Another train of thought that has developed in distance education is that mediating technologies pose a unique set of problems and opportunities for instructors using these technologies (Salomon & Perkins, 1987; Salomon & Tamar, 1984; Tobias, 1987). Florini (1989), Gagné and Briggs (1979), Johnson and Foa (1989), Kraus and Fussell (1990) are a few of the many who believe that instructional videoconferencing courses require planning and applied theories that may differ from traditional lecture courses.

Ellis (1992a) and West, Farmer, and Wolff (1991) suggest that those involved with instructional technologies pursue a design course aided by current work in cognitive science theories. Desired outcomes such as critical thinking and creative development of the student are thought to be achieved more easily and with a more developed rationale for reaching these goals. Hansen (1989) and Hanson and Gueulette (1988) state that the potential for visual images to augment learning must be included in the curricular design. Auditory input beyond the traditional voice-only lecture format is also thought to be an important consideration in the pedagogical/andragogical design in order to facilitate added impact in the learning process (Anglin, 1987; Eriksson, 1988; Kosslyn, 1975; Tufte, 1990). Although these considerations are not necessarily unique to the instructional videoconferencing setting, instructional videoconferencing does provide an opportunity to allow for more integrated uses of these technologies.
By stepping out of culturally-regimented or tradition-bound approaches to education, the proponents of cognitive and perceptual theories are suggesting that instructional designers, particularly as it relates to technology-mediated learning, plan in advance how to capture the potential benefits of theory-based instructional design while at the same time giving a voice to the students who will be engaged in these learning opportunities. As a result, researchers in the field of technology-mediated learning should evaluate whether instructors have adopted a particular cognitive theory or specific instructional strategy and why. One way to determine the planning and involvement of the instructor is to test whether s/he has followed some type of instructional development plan.

A typical model of instructional development flows through processes of needs assessment, goal setting, design, production/development of material, implementation, evaluation, reiteration, re-evaluation, and re-implementation (Flagg, 1990; Merriam & Caffarella, 1991). Instructional designers for traditional as well as technology-mediated classes have recommended this or similar procedures. Assessing if an individual has attempted such forethought in the development of a course can be a difficult task, but there are some methods that allow the researcher to make determinations concerning the practice of the instructor within the course. Specifically, the researcher can ask instructors about the time spent in material preparation, classroom encouragement, intentional memorization strategies, and using feedback elicitors. Combining honest questions with classroom participation and observation should allow insight into the instructional strategies.
One concern, however, is that an instructor may have a particular ideal s/he wishes to attain in a course, but the practice of the classroom may fall short of the anticipated strategies. Why would this be the case in a course? What do the learners say about the approach adopted in the instructional setting? Do the students believe that particular strategies have helped them in their coursework? Would they recommend the adopted learning strategy to other students? By assessing the implementation of highly structured or unstructured instructional strategies from the perspective of the learners and their own feelings about these strategies, the researcher can make a determination of the usefulness, feasibility, and desirability based on the participants' own experiences.

**Audience factors: Student Characteristics**

In the case of instructional videoconferencing for adults, the question must be asked whether the strategies are in any way peculiar to this population. This is an important question because of the rapidly growing nontraditional student population. Adult learners, sometimes referred to as nontraditional students, are usually classified as those individuals that are returning or entering higher education after five years or more away from educational institutions and are carrying multiple responsibilities (such as child-rearing, full-time employment, home maintenance, etc.) not typical of an individual having not yet left the education environment (Darkenwald & Merriam, 1982; Knowles, 1978; Weisner, 1983). Indeed, multiple responsibilities make it difficult, if not impossible, for potential students to enroll in courses that are only offered at specific locations or at certain times. Wiesner (1983) and Milheim (1989) mention multiple responsibilities as an important consideration for research and practice in distance
education because of the expectation of adult learners, or the *new traditional* students, to be receiving high quality education that is considered useful to their lives.

Current trends in population growth and in university enrollments show that each year, more individuals are entering school at older ages and after longer time periods away from school (Merriam & Caffarella, 1991). As this population grows, and as more businesses and industries demand more and continuing education from their employees, the need for more flexibility on the part of the universities, community colleges, etc. will continue to increase. Instructional videoconferencing provides a compromise situation for many of these new traditional students (Brown, 1988; Hortin, 1988).

**Implementation**

Once thought about, designed, financed, and finally put into place, an instructional videoconferencing setting is not finished. Rather, the users of the system are required to monitor and maintain the system on a regular basis—to the point that one might call the process one of on-going re-design. An instructional videoconferencing setting may be designed with all previously named factors taken into consideration and with unlimited financial restrictions, yet still be plagued by problems (Wilcox, 1984). The source of the problems may not be with hardware, design, or philosophical orientation. The problems may be the result of user implementation practices (Wilcox, 1984; Thompson, 1987).

An assumption that affects the study of the implementation process is that all social settings, since they involve people, are themselves inherently dynamic. Systems are subject to change and adaptation as the individuals that work and live
in these systems change (Merriam, 1991). Unfortunately, change or lack of change does not always happen in a productive manner. Failure has beset many instructional technologies, and one of the frequently cited reasons is because of the lack of maintenance (Gayeski, 1989). This maintenance can take at least two forms.

One form of maintenance is in the simple physical maintenance of the instructional videoconferencing facility. Equipment breaks down, light bulbs burn out, chairs begin to wobble, monitors go out, and cameras lose tubes or chips. An active maintenance schedule must be planned into the on-going operations of an instructional videoconferencing facility.

If there is no physical maintenance, problems will eventually arise to hinder or halt the operation of an instructional videoconferencing facility. The researcher exploring an active instructional videoconferencing setting should be aware if regular maintenance strategies exist and how any reimplementation plan is put into place. If there is some planned maintenance schedule, are the users of the system following the prescribed format? How does re-design and reimplementation occur, if at all? Answering these questions can shed light on attitudes concerning the future significance of this technology to those using the system.

Another form of maintenance is in the ability of the facilitators of the course to make sure that students are not being excluded from participating in the technology-mediated course. This “social” maintenance is pointed to in traditional classes as being an important factor in the establishment of relationships and positive development of student attitudes toward the course and
instructor (Kearney, Plax, Smith, Sorensen, 1988; Kearney, Plax, Wendt-Wasco, 1985). The maintenance in these instances is often referred to as immediacy behaviors by the instructor, a concept addressed in the earlier section dealing with turn taking.

Do the facilitators in a course understand what it is that they are trying to do with respect to maintaining student involvement? Have they been exposed to any type of training making them aware of what they are doing? What will they be doing in the future with these technological innovations at their disposal? On the other hand, are the students in any way made aware of the concerns they might need to know in advance or after a mediated course? How are they allowed to maintain actions or attitudes that will contribute to the successful implementation of the course? Is there any type of training for the students enrolled in an instructional videoconferencing course?

**Summary Problem Statement**

The questions that are raised in this literature review are broad in their range and focus, but all refer back to the initial question--How can an interactive instructional videoconference be made more successful from the perspective of the users of the system? The researcher evaluating instructional videoconferencing must be concerned with design and implementation of a setting that can deliver user satisfaction based, in part, on these factors which lead to an overall construct of presence. Specifically, staging, shot selection, turn-taking, lighting, camera-monitor-subject relationships, time utilization, audio management, instructional strategies, and physical and social maintenance of the instructional videoconferencing environment serve as the main areas of
investigation for this project. Because of the variety and scope, a methodology that considers the broad picture with an eye toward change and improvement in the design and practices of instructional videoconferencing systems is most appropriate.

**Summary Questions**

Questions that are raised by this approach include the following. How is the videoconferencing studio arranged? How does the lighting affect the images transmitted to the participants? Is it harsh, adequate, or dark? How is audio handled in the instructional videoconferencing setting? Does it allow the students to interact comfortably with others in the videoconference? What size monitors are employed in the instructional videoconferencing setting? Who chooses the camera shots and angles? What do the students feel needs to be improved in the instructional videoconferencing process? Do the students view the instructional videoconferencing setting as facilitating their learning? Would the students select an instructional videoconferencing setting or a traditional lecture course if given a choice? Why? What preparations do the instructors pursue to accommodate the videoconferencing experience? How do all of these factors work together to shape the attitudes by altering the experience of another’s presence by the participants? What adaptations to inappropriate or inadequate instructional videoconferencing designs do the participants pursue in the implementation stage of a course? These questions serve as a basis from which to begin an investigation that will help lead researchers in instructional videoconferencing design to key issues that should be considered throughout the development and use of instructional videoconferencing.
Kuhn (1970) suggested that scientists come up with innovative solutions to problems or to answer questions previously difficult to answer by changing the way in which the situation is viewed. Kuhn referred to this change as being revolutionary. Though many have embraced Kuhn’s paradigm shift and it may no longer be a perspective that is considered alien or revolutionary, he did bring into focus a common problem in many disciplines; namely, that researchers and designers tend to get locked into certain philosophies that may or may not be appropriate for the types of questions that need answering. Moving instructional videoconferencing away from the traditional broadcasting model to a user-centered model of design is such a shift. In addition, research in technology-mediated learning must shift away from a positivist perspective that privileges the views of the researcher and begin looking to the researched as an original source of information in education.

In light of the previously stated concerns, what are the salient communication factors for adult participants in a successful instructional videoconference? This is the primary question of this dissertation. Contextualizing the instructional videoconferencing experience must be a part of the research process in order to answer this question. The researcher must consider the design of the instructional videoconferencing setting from the perspective of the participants within their particular setting. Argyris, Putnam, and Smith (1985) would see the ultimate goal of the study as being one of change toward improvement--making the instructional videoconferencing better for the participants. Research is a process of exploration, a striving for understanding
that leads to future change. This assumption is the catalyst for the following chapter on methodology and method.

1 Andragogy is a term coined by Malcolm Knowles (1978) referring to the process of educating adults. This term was created since the term pedagogy, by its very derivation from the Greek word παιδαγωγός [paedagogos], meaning a child’s tutor, implies the teaching of children. Andragogy was selected since the root term ἀνήρ [andros] means adults, people or mankind and, thus, the term andragogy seemed better suited for the unique discussion of the practice and theory of teaching adults.
Chapter II
Methodology

Introduction

*A critical social science engages human agents in self-reflection in order to change the world*—Argyris, Putnam, Smith (1985, p.6)

Deetz and Kersten (1983) state that one principal objective of research is social change. Specifically, “critical research seeks to contribute to the establishment of free and open communication situations in which societal, organizational, and individual interests can be mutually accomplished” (p. 148). Habermas (1979) views this social change as the result of a reconstructive process that can only emerge from science that gives voice to the subject. Habermas writes:

reconstructive procedures are not characteristic of sciences that develop nomological hypotheses about domains of observable events; rather these procedures are characteristic of sciences that systematically reconstruct the intuitive knowledge of competent subjects (p.9, emphasis in original text).

Traditional or mainstream science (i.e. positivist rationality) in the particular setting of educating humans is not oriented toward social change since the task is observation, not reconstruction (Argyris, Putnam, & Smith, 1985).

This philosophy of forwarding social change through the voices of the social participants is the driving force behind this study. How can an interactive instructional videoconference be made more successful from the perspective of the users of the system? Argyris, Putnam, and Smith (1985) identify this approach to research as “action science.” This dissertation adopts the two main
premises or philosophies of Argyris et al. First, as they quote Kurt Lewin, “one of the best ways to understand the world is to try and change it” (p. xii) and second, that research ultimately is “a collaborative relationship between researcher and subjects or clients” (p. xiii). This researcher intends for the participants in the instructional videoconferencing setting to self-reflect on what is required to make instructional videoconferencing successful. This, in turn, may allow at least this one small part of the world to change for the better.

**Philosophy leading to praxis**

Deetz (1982) argues that a philosophical foundation honoring social change establishes for the researcher the roles of understanding, critique, and education which leads to empowerment for those being studied. Deetz and Kersten (1983) explain these concepts in the following passage.

Understanding requires descriptions of the social reality in the organization and the forces that form, deform, sustain, and change the reality. Critique focuses on examining the legitimacy of consensus and reason-giving activities in an organization and the forces bearing on them. Education develops the capacity of organizational members to engage in self-formation through participation in organizational practices and decision making that are free and unrestrained. (p. 148)

However, answering the question as to how an individual carries out these duties is filled with controversy.

Bernstein (1976) discusses the debate generated over the interplay between theory and practice. He writes:

there is a dialectical movement from the advocacy of empirical theory to the realization of the necessity for interpretation and understanding of social and political reality...there is a growing {albeit, a very slow growth-author} recognition of the need for the type of critique that has a practical interest in the fate and quality of social and political reality. The search for empirical correlations, the task of interpreting social and political reality, and the critique of this “reality,” are not three distinct types of
inquiry. They are three internal moments of theorizing about social and political life. (p. 174)

Consequently, when one attempts to examine a phenomenon such as the role or functions of an instructional technology in a given context, a conscious decision must be made on the part of the researcher to try and check the researcher’s own epistemological, ontological, or methodological biases. However, this is not to say that the researcher is an outsider to the role of discovery.

Rhoads (1991) asks the question, “Is an observer completely independent of what he [sic] investigates?” (p. 39). In dealing with this same question some years earlier, Horkheimer (1972) concluded that the answer is a qualified no.

The scholarly specialist “as” scientist regards social reality and its products as extrinsic to him, and “as” citizen exercises his interest in them through political articles, membership in political parties or social service organizations, and participation in elections. But he does not unify these activities, and his other activities as well, except, at best, by psychological interpretation. (pp. 209-210)

For Argyris, Putnam, and Smith (1985) this is the wrong question. Instead of asking if the investigator is completely independent, they see the question as what can the researcher do so that change might be facilitated but not harm the subjects being studied. Independent, objective research is viewed as a false construct and a confining condition within which to work (Argyris et al, 1985; Geertz, 1983). The objective becomes one of making sure that any influence exerted by the researcher contributes to the positive workings of the culture/social group being examined.

However, this perspective is unusual in the literature about instructional technologies. The typical focus is on comparing the technologies to traditional classroom settings, comparing design of varying technologies, or the replacement
of personnel by the technologies. What one may conclude from these veins of
discourse is that those working in instructional technology research have adopted
what on the surface appears to be a primarily positivist view of science. In other
words, researchers are attempting to establish universal concepts that will apply to
the design and implementation of these technologies to a mass audience. If a
universal truth about mediating technologies applied to education could be
derived, then designers’ jobs certainly would be made easier. Unfortunately, the
diversity of transmission technologies, students, instructors, topics, cultures, and
other variables contribute toward making universal truths unlikely. As a result, a
certain philosophy guides the methodological decisions of this dissertation--
contextualization is necessary for understanding.

Action science as presented by Argyris, Putnam, and Smith (1985)
promotes change as an approach to gaining understanding about the particular
context. This can be true even where change is attempted but resistance is met.
Allowing action to reveal the context helps the researcher know what forces from
markets, technologies, and users are impinging upon the system. In a normal
science approach privileging universal truth about a social setting, the complexity
of the context are overlooked. By attempting to change the setting to the extent
that it is somehow made better in the minds of the users, key areas of concern can
be uncovered. This is particularly true when applying action science in an
ethnographic manner.

Ethnography, as the term implies, is interested in the culture and workings
of a particular social setting. The operationalization of trying to understand the
culture and workings of the social setting implies involvement of the researcher
over some period of time. The reason time becomes important, both from the standpoint of ethnographic work and action science is that change and culture are aspects of societies that consume time. Change takes time and seeing culture takes time. If a researcher were to go into a culture and not provoke certain aspects of change according to what those participants perceived as being more desirable, there would be no way to see what is truly important to those who hold power over those in the society.

In instructional videoconferencing, there are clashes of culture because of the diversity of students, faculty, support personnel, and administrators who come together, but this clash ends up yielding a certain culture unique to itself. The bringing together of a variety of individuals for a single purpose helps to coalesce a group into a coherent and functioning social group. Through studying this group over a period of time and with the intent to improve the workings of the group, then the researcher can feel more confident that the findings from the ethnography are consonant with the realities of the group for that moment in time. Instead of looking for end results, as is common with much of normal science, what emerges important are those processes that lead to certain actions or results.

Geertz (1983, 1983/1988) in his discussion concerning ethnographic methodologies, deals with this problematic. In his evaluation of research methodologies, the major weakness in most is a lack of insight gained from studies that rely on describing the result of a process as opposed to the processes that lead up to the results. Therefore, this dissertation will attempt to reach conclusions and implications by examining the contextual relationships of the participants, setting, topic, administrators, and others who may play a role in the
process of a particular example of instructional videoconferencing by trying to
influence and affect the success of the experience.

The following is a general description of a specific user group that will
serve as the data collection site for this action science approach to studying
instructional videoconferencing.

Setting

The College of Agriculture, one of the oldest academic units at The Ohio
State University agreed to allow their interactive videoconferencing network to be
studied for three consecutive quarters. In this particular network, the courses
taught are 80 to 100% at the graduate level and are delivered via a microwave-
based, 2-way audio/video interactive system. This system connects the main
campus to a research station located approximately one-hundred fifty miles away.
Typically, 4 or 5 courses are delivered through the videoconferencing link each
quarter with no more than one undergraduate level course. Each course can have
anywhere from 5 to 50 students, depending on the course and the level (Jacobs,

This interactive system utilizes fully equipped video and audio studios at
both locations. Multiple cameras, microphones, and monitors are available at
each site. Once a meeting or class commences, analog signals are transmitted via
fiber optic to a microwave conversion site. The signals are microwaved to a
receiving station which downshifts the signals and transmits the signal to the
receiving studio through fiber optic lines. Future plans are to link both facilities
directly with fiber optic cable. Since the specifics are important to this study, a
more detailed description of individual videoconferencing room design and delivery systems will be included in the write-up of the relevant data.

The stated purpose for establishing and maintaining this system was and is to allow distant research faculty and students to remain on the premises of the research facility while still being able to be involved with courses on the main campus (Newcombe, 1992). The emphasis of this study was in examining the communication processes unique to the electronic classroom environment— the instructional videoconferencing setting. The purpose was to explore those factors within a complex setting which seemed to be of concern for participants so that future design and implementation of 2-way interactive videoconferenced instruction can be improved. What follows is a description of the courses and the participants used in this project. This description allows transcriptions and discussions to make more sense and to provide a context from which to understand what was involved in this project.

The Courses

This research was focused on two courses from two different departments within the College of Agriculture. This was not an attempt to create a means of comparison (although some comparisons can be made), but was a way to broaden the pool of prospective respondents. Graduate courses in each of the departments typically have fewer than twelve students in any one class. By selecting these two classes, the chances were increased that a larger number of students, faculty members, and staff who work with the videoconferenced classes would be available. Another reason for the selection of these two courses was because of the differences in the instructional style.
One course used a straight lecture format with two individuals conducting all of the lecturing, the other course used a seminar format. Two instructors facilitated the presentations of students and faculty in their personal areas of research. This diversity in styles and approaches offered a wealth of information from which to draw for this project.

Even though the researcher had little familiarity with agriculture, he became a part of each of the courses as a student. He did not register for the classes or take exams, but attended the class sessions, asked questions, and answered questions when it seemed appropriate. This worked effectively. All instructors contacted were happy to have a researcher be a part of the courses. Other students treated the researcher as just another student. If for some reason the researcher was held up in traffic or in finding a parking space, students would reserve handouts and go out of their way to make sure he was up-to-date on the happenings of the class. This was true in both courses.

The first class was the course used for the formative stages of the dissertation design—the field test and pilot study over different quarters. This was a seminar course that met twice a week—once using the video link and once using a traditional classroom. This course was attended during both class meetings each week for three quarters and the researcher became friends with a number of the individuals who worked with the course in all capacities. This class will be referred to as the seminar course. The general topic of this class was current research in a specific area of agriculture.

The seminar course was set up to allow finishing graduate students and professors to share their research and ideas. There were no exams in this course,
but students were expected to write evaluations about each research presentation. They were to comment on the importance of the research, the effectiveness of the presentation style, and the general utility of the research to their own work.

The second course was a straight lecture course that covered highly technical information. A mid-term exam and a final exam were the only graded components of this course. Each exam was essay format and required approximately two hours for each of the students to finish writing on five questions. This class ended up being enrolled entirely of international students (as will be discussed later) and will be referred to as the international student course.

These two classes, the seminar course and the international students course, were very different in style and design but yielded a high level of continuity in terms of the reactions of the participants to the videoconferencing environment. The participants in these two courses were valuable resource people who offered intelligent responses to the technical conditions they faced in these courses.

The Subjects/Participants

In the Spring quarter of 1993 when the final data collection occurred, the combined involvement of the two courses at both sites was a total of thirteen students enrolled for credit, three enrolled as audit students, one unofficially auditing student, three official instructors, six paid technicians/television producers, and one graduate student intern who were all involved to some degree in the process of making the courses work. In addition to this number, there were four guest faculty lecturers in the seminar course and one in the international student course, several participants who visited the courses when there was a topic
of interest being discussed, three administrators who assumed varying roles in making sure the courses operated adequately, one departmental secretary who worked closely with one of the courses, and myself—the researcher.

The students and instructors agreed to allow themselves to be studied by signing a form stating they permit use of their comments as long as they remain anonymous in the reporting of the study in whatever medium selected. The paid staff members also agreed on the same stipulation. The participants were involved in face-to-face interviews, focus group interviews, and/or casual conversations in classes that were recorded, in combinations of two or more.

The age of the students averaged approximately 37 years. There was only one student under thirty in the two courses. Most students were enrolled at the Ph.D. level, but four of the students were working at the Masters level. Only one person had not had any real work experience outside of the educational setting. The majority of students had returned to school after working in careers. This was a group perfect for the study. They were adults who had real life experiences from which to draw conclusions they considered potentially useful to the project—a very diverse and enlightening group of people.

One of the first concerns of the study was in the gender of the participants. All instructors, all technicians, both administrators, myself, and most students were male. Three of the for-credit students, one of the auditing students, one student who was simply sitting in on the course, and a departmental secretary who worked closely with one of the courses were female.
Gender bias?

This phenomenon was discussed with several of the faculty and students in face-to-face interviews at different times. The question that needed to be asked was why were there so few females in the department in terms of faculty and staff, and even to some extent, students? The participants answered with comments similar to this female’s response, “Partly because agriculture for a long time was a male dominated area. The men were the farmers and eventually the men were the ones that came to school to study more about farming. This is beginning to change but we are still catching up.” This issue was viewed as important.

Feedback from individuals who participated in the study was solicited so they could inform this study if this was a problem from their perspective.

One female participant responded with this comment, “Well, sometimes it is a bit intimidating for me. My undergraduate degrees are not in agriculture and for me to become a grad student in the department, plus being a female was a bit disconcerting. But, it has all worked out well. There are a couple men that are not the greatest to deal with, but I have found that more women are entering the field and we are getting more respect all the time.

From the perspective of one of the female students, one could infer that being a female in a male dominated area still was not as comfortable or easy as it should be. Part of her concern was also based on her coming out of a different academic background. But there was enough indication that the potential for one-sided views being introduced was possible. It was decided that the researcher should make a point to not privilege one view over another because of the risk of
gender bias being introduced unknowingly. Fortunately, the females who were involved in these two courses were some of the most vocal people in terms of their contributions to the typical conversations in the classes, the focus groups, and in interviews with their responses to my questions. In other words, the fact that there were very few females did not prevent them from voicing their own unique or gender-based opinions.

International participant bias?

The second unexpected aspect of the participants was the international nature of the students. In one course, after several individuals dropped, all remaining students were born as citizens of countries other than the United States. Two students were from Taiwan, one from Malawi, two from India, one from southern Africa, and one from Nigeria. In the seminar course, there was a much lower percentage of international students, but India, Brazil, China, and Malaysia were all represented in addition to the United States.

To have such a culturally diverse group with whom to study the videoconferencing system was exciting. The information gathered would not be as bound by culturally specific factors. However, an interesting question arose in evaluating the international student course. Why did the American students who enrolled drop the class?

Several questions were raised in encounters with the participants in this study. Are American students less tolerant of an instructor’s teaching style? Do Americans have imbedded philosophies as to what constitutes good teaching? Are international students more accepting of a one-way philosophy to education? Do American students require more stimulus because of greater exposure to other
media? Did the Americans feel they were being short-changed because the teacher was not present? Or, was it simply easier for the American students to ignore the technology?

The American students who dropped seemed to go back to the teaching style--they simply expected more than a top-down approach to learning, particularly at the graduate levels. However, these students did not eliminate the possibility this particular course was easier to drop because it was delivered over the videoconferencing link. The participants who continued on in the program provided a rich source of data, as well. In order to understand how these individuals were viewed, an understanding must be provided of the person who was doing the data collection. The following section deals with giving a more in-depth view toward the area of inquiry.

**General area of inquiry**

Based on the previous discussion, there were two constructs that served as the starting point of this study--participants' affect and perceptions about the learning process in this environment. The expectation was that in this type of naturalistic inquiry, these constructs would lead to further items important to the overall study. However, these two constructs, as they relate to the concepts inherent in a mediated classroom, formed the foundation and the starting point from which to begin the inquiry. The following sections discuss what is meant by affect and what is meant by perceptions of the quality of the learning process.

Affect, according to typical dictionary definitions is simply feelings and emotions (Stein & Hauck, 1975; Chambers, 1972). The problem with such a simple definition is that it creates a dilemma for the researcher. How does one
study feelings and emotions about any event in an individual’s life? What makes up these feelings that are inherently complex and intertwined within the whole of the person? Mueller (1986) prefers the term attitude, but defines attitude as “that affect for or against” (p.2-3). He later goes on to incorporate Thurstone’s definitions and states that attitude is “(1) affect for or against, (2) evaluation of, (3) like or dislike of, or (4) positiveness or negativeness toward a psychological object” (p.3). Mueller’s latter definitions help the researcher determine what affect or attitude is in a more concrete sense. By referring to affect or attitude as the like or dislike or the positiveness or negativeness toward a psychological object, then the job of operationalizing the construct is made somewhat simpler.

In trying to determine affect, the job of the researcher in this case is to first determine the attitudinal object (Mueller, 1986). Here, the attitudinal object is the mediated class environment’s influence on education. With this as the object, the researcher must include a wide variety of concepts to obtain affect.

According to Knowles (1978), the adult learner and the facilitator of learning for adults need to be concerned with a number of important concepts that lead to affect development. Among these concepts are like/dislike on an interpersonal level between the facilitator and the learner, accessibility to content by the learner, motivation of the learner for being involved in the learning process, control and input of the learner in the learning experience, rewards or gains the learner receives from the learning experience, and relevance of the learning experience to the pragmatics of the learners’ lives. These concepts can be considered as building blocks to the assemblage of the construct this report is calling affect. Unfortunately, getting to what the participants truly feel about
these questions in not easily accessible to the researcher. However, the researcher can ask the participants to share their feelings openly and honestly and trust that the responses are genuine.

In the specific setting of interactive videoconferencing, then, several questions need to be asked. What feelings do students and faculty in this environment attach to the mediated classroom experience? Are students and faculty comfortable in the process of interaction in this environment? Do they prefer face-to-face or videoconferenced interactions if given the choice and why? Have they liked/disliked earlier attempts at mediated learning? How do the participants like this setting compared to others they have experienced in the past?

The researcher must strive to allow the participants to provide their own thoughts concerning the functioning and utility of the instructional videoconferencing experience based on their own unique history and motivational goals. Again, not prejudicing the respondents with certain types of questions or biases is very important in this process. The objective here is to research the participants' perceptions. Perceptions are what the participants sense as being the actualities of the experience from their unique position in the experience (Schutz, 1974).

For the naturalistic researcher, the illumination of perceptions are a part of the phenomenological process of getting to the "me" of the experience (Geertz, 1983/1988). By understanding what the participants are perceiving to be the actuality can assist in the development of an analytical frame with which to assess meaning (Charmaz, 1983/1988). The participant in any type of classroom is immersed in a rich sensory experience and develops a host of responses to the
situation based on the interaction of these senses with their own interests, knowledge, motivations, priorities, and state of mind that lead to a series of assessments and conclusions. Therefore, both the elements that stimulate an individual to attend to a particular event and the background and history that help bring meaning to that stimulation are important to the overall understanding of the setting for the researcher.

Finding the answers to the following questions assisted the researcher in making a determination as to what perceptions are relevant to improving the overall instructional videoconferencing experience for the participants. What do the participants believe to be the problems/advantages related to the specific setting? Was anyone excluded from participation because of mechanical concerns such as sound or sight barriers or did someone enjoy an advantage because of sound or sight factors? What did the participants perceive to be their role in the setting? Did the participants believe they contributed to the overall process? Did the participants believe the process contributed to them in some positive way? What suggestions would they make with respect to improving the overall setting? Would they be involved in this type of process in the future? Each respondent in this setting will elicit varied perceptions because of their unique position in the setting, personal development of perceptual skills, and their background variables like reasons for taking the class, etc. which act as key filters for their perceptions.

Naturalistic inquiry is concerned with the contextualized responses of participants (Jorgensen, 1989; Thorne, 1983/1988). If a researcher has been allowed to enter into the thoughts of the respondents and has an accurate assessment of the situations that lead up to the responses, then the information
obtained from any individual can be said to be useful and meaningful data. The emergent nature of naturalistic inquiry anticipates changes in the research process. This is not considered a dilemma to the researcher, but a strength of this particular paradigm (Van Maanen, 1988).
Method

Methods used in this study were participant observation, focus-group interviews, face-to-face interviews, and assessment of videotaped sessions. The following is a discussion of the application of these methods to the particular setting of the 2-way audio/video interactive instructional videoconference.

Participant Observation

The first strategy employed in this study was taking on the role of participant observer. This is a process whereby a researcher is allowed entrance and is accepted into the workings of an on-going social group for the main purpose of keeping a log or diary that is a record of the interactions, occurrences, and anomalies that the researcher witnesses in the course of his/her observation (Jorgensen, 1989). In this specific situation, admittance into the group is controlled by the instructors of the mediated courses. Acceptance as a member of the group is controlled by the other participants (Jorgensen, 1989). Since this researcher was not working from the same knowledge base for the graduate courses that served as the pilot and actual study data collection sites, the ability to be considered a part of the group seemed limited. However, admittance by the instructor and a regular presence in the courses allowed for a thorough exposure to the functions of the instructional videoconferencing setting.

This allowed what Geertz (1983/1988) calls “thick description” to contribute to the understanding of a series of strips that were recorded by this ethnographer. Through this type of descriptive process, patterns or significant breakdowns in interactions were analyzed. From these occurrences, inferences
were drawn that lead to an answering of the question(s) that initially drove the study or lead the investigator into a more appropriate set of questions.

Over time, this participant observation led this researcher into a richer and contextualized assessment of the setting being explored. Though the process of participant observation is inherently interpretive, the interpretation is useful if the researcher has provided enough detail concerning the interactions being reported (Geertz, 1983/1988). Consequently, the researcher must be aware of his or her own dominant perceptual modes. A description of the researcher and his preferences are described in the following chapter.

In this participant observation process, the researcher was able to collect a variety of data. In addition to recording interactions, discussions, breakdowns, and researcher thoughts and perceptions, supplementary material such as syllabi, handouts, evaluation sheets, and other documentation helped the researcher reconstruct what happened in the setting. Participant observation served as a good starting point for investigating these social groups and seemed particularly well-suited for a classroom environment.

Focus-group interviews

The second strategy used was field interviews in a focus group setting. According to Patton (1990), a focus group is a collection of participants that typically ranges in size from 6 to 8 members and where interviews last from 1/2 to 2 hours in length. One reason for using a focus group is based on a social-context theory of decision making (Patton, 1990). Frequently used as a consumer assessment process, focus groups acknowledge the fact that people often decide
what they like/dislike, what they will purchase, or what they will continue to support based on interactions with other people (Morgan, 1988).

The focus-group interview was not intended to lead the group to a consensus concerning the topic at hand. The focus group "is an interview" (Patton, 1990, p. 335). Consequently, the interviewer attempted to maintain an open and nonconfrontational approach to the data collection process, as well as ensure equal contribution and access to the interview responses. These were concerns handled primarily by the interviewer.

Because of the effort required to guide a focus-group discussion, another individual or some type of mechanical recording device is recommended in order to guarantee accurate data collection (Patton, 1990; Morgan, 1988). The interviewer must be involved verbally and nonverbally with the participants to portray to those contributing that their thoughts and ideas are valuable and useful to the study. This interpersonal aspect of the focus group can be either a positive or negative attribute, depending on the skill of the interviewer.

Other problems that are important to consider with the focus group is the need for respondents to conform to some group norm, the history of the groups can vary significantly from one time to another, and achieving some kind of comparability from one group to another may be difficult. There is the possibility for other problems associated with interviewing in general that are discussed in the instrumentation section of this report. However, the focus group does provide other significant advantages that seem to outweigh the potential problems (Morgan, 1988).
Patton (1990) enumerates several positive factors that follow from focus group interviews. He states that this type of data collection method helps to:

provide some quality controls on data collection in that participants tend to provide checks and balances on each other that weed out false or extreme views. The group's dynamics typically contribute to focusing on the most important topics and issues in the program, and it is fairly easy to assess the extent to which there is a relatively consistent, shared view of the program among participants. (pp. 335-336)

This socially stimulated response and verification is the most compelling rationale for selecting this method. “Focus group interviews, when conducted carefully and used appropriately, promise to provide a rich, new way of gathering qualitative evaluation information (AED, 1989; Krueger, 1988; Morgan, 1988; Higginbotham and Cox, 1979)” (Patton, 1990, p. 337). This was found to be the case in this study.

**One-to-one interviews**

The third strategy used in this study was one-to-one, face-to-face interviews. The rationale for question selection was similar to the focus group interview. But in contrast to the focus-group setting, a one-to-one interview allowed the researcher to probe and explore more deeply the history, opinions and concerns of the individual without the respondents feeling the need to comply with group norms. The interviewer attempted to establish a comfortable, relaxed atmosphere to discuss with the participants their views concerning the program. This type of setting is where new, corroborating, or otherwise useful data can be collected in a socially unconstrained setting (Lincoln & Guba, 1985; Patton, 1990). This was consistent with the interviews conducted as a part of this study.

The goal of this setting was to verify and extend the information gathered in the focus groups and in the participant observation. One problem associated
with doing this in the one-on-one interview was the issue of confidentiality. Respondents were reluctant to divulge information they felt was self-incriminating. In this case, being critical of the course or instructor before grades were assigned made some hesitant to share their true feelings. The interviewer assured them their responses would be kept anonymous. The only person who was permitted to know the source of the comments was the interviewer.

Acknowledging their concerns and trying to reassure the respondents did seem to allow honest feelings about the videoconferenced course to emerge. These responses were compared with the data from the other two processes to determine how much consistency there was in the answers from the respondents. This triangulating (quadrangulating?) of data can only enhance the usefulness of the data collected. Where the focus groups may provide a good snapshot of the overall thoughts and attitudes of the class, the one-to-one interviews allow for filling in the holes or adding color or shading to areas that were undeveloped as primary points of concentration. The following strategy helps to complete the picture.

Videotape Assessment

The final strategy for collecting data was the assessment of videotapes made during the instructional videoconference. As a participant observer, the researcher was immersed in the real-time events of the class and attended to the specifics of the particular context at that time. However, this immersion may focus the attention of the observer to a limited area (Jorgensen, 1989). Videotapes of the same events can allow the researcher to view and review the event and attend to other elements not included in the real-time assessment of the class meeting.
This final strategy was an attempt to control for errors that may be introduced by the participant observer's own perceptual bias.

Since each class studied was using two-way video/audio, each session was recorded from both ends. Consequently, one one-hour session resulted in two one-hour tapes, each from the perspective of the cameras at both Wooster and Columbus. This allowed for an added observation that was not always possible in the real-time of the class; namely, that it was possible to view a portion of the instructional videoconference as if present at the other site. The missing elements were the people present at the other site who also viewed this particular image.

Videotapes served as an efficient recorder of interactions that occurred during the broadcast time of the class. Images of the participants at the Columbus site were occasionally recorded before the class time began, but typically no information before or after the assigned hour was recorded since cameras were not transmitting. These tapes offered an outside view of the instructional videoconferencing experience.

**Interviewing Issues**

Patton (1990) believes there are at least three types of interviews used in naturalistic studies--informal conversational interviews, general guided interviews, and standardized open-ended interviews. Each of these have particular strengths and weaknesses which allow the researcher varying degrees of flexibility in the interviewing process. Within each of these categories, the researcher must make decisions according to the sequencing, wording, and content of the questions being asked. At each level in the researcher's decision-making process, some information will emerge as more relevant. The researcher
must be aware of the implications of the decision-making process so that when the interviews take place, the desired information is not deleted by the interviewer through poor question selection.

Informal conversational interviews run the risk of not getting at the pertinent information and seem more inclined to function optimally in a participant observation setting where the participant is at the same knowledge level as the other participants. The setting for this study was graduate-level agriculture courses, a topic in which the researcher/interviewer in this study was not well-versed. This fact precluded the use of strictly informal interviews.

Highly scheduled interviews seem to pose an equally significant threat to the focus of this study. This type of interview permits a high degree of comparability. Unfortunately, the nature of highly scheduled interviews requires the researcher to assume what information is most important or salient to the group in advance. This type of interviewing seemed to deny the exploratory technique this study attempted to utilize and was also ruled out.

Thus, the interviewing style that seemed most appropriate to this study was the general interview guide approach. According to Patton (1990), this approach allows the interviewer to collect a comprehensive and somewhat systematic set of data. The researcher is given the flexibility to anticipate logical gaps and to fill those gaps with new questions. Interviewers can remain conversational and relaxed in the interviewing process. This, in conjunction with the ability to stay current and grounded in the situation, contributes to the desirability of this process. However, this process is not without certain problems.
Patton (1990) and Lincoln and Guba (1985) see this type of interviewing as having the potential to inadvertently omit salient and important topics. This may be a significant weakness with this form of interviewing. Another problem relates to the overall loose nature of this process. Comparability across respondents can be difficult. However, by using a set of common questions for each of the interviews and expanding those common questions based on the circumstances, the researcher has a way to compare among respondents. Creating the common questions script were managed in the formative stages of the instrumentation development.

In this study, a field test was conducted with several members from a videoconferenced course comparable to the ones used the following quarters for the pilot and main study stages of the project. Using this course in advance permitted the researcher to test the instrumentation on a pool of subjects who were comparable with respect to age, educational level, and experience with mediated courses to the groups studied for the final data collection.

The field test involved using the actual interview guides in their respective settings. Once the respondents answered the questions, they were asked to comment on how those questions dealt with their feelings and perceptions as a whole. Did they find that the questions allowed them to express what they thought was most relevant to their views? Did the interviewer seem approachable? Were they inhibited in any way by the types of questions asked? Were they inhibited by the interviewer’s mannerisms or tone of voice? How would they change the interviewing process? Was there adequate time? Did the interviews take too long? Interview guides can be made comprehensive, easy to
understand, and enjoyable for respondents without taking up too much of their time in the interviewing process. But getting there was not always easy.

One problem encountered with this process was that most respondents felt obliged to be polite to the point to answer all questions in a non-critical manner. Few responses indicated change was necessary. The guides were sent to an expert on interviewing and instrumentation in the agricultural education community as well as to several experts in the field of instructional technology for suggestions. Most changes implemented were based on the expert suggestions and not from the respondents.

The pilot testing of this instrument took place with one section of one class being taught via the interactive videoconferencing network. This made the pilot study subjects a suitable group with which to re-test these instruments since they were a subset of the actual population being studied. One potential problem this presented was that one of the respondents ended up being involved in all three phases of the research.

The number of students in each of the graduate courses is relatively small (5-12). Since this study did not involve inferential statistics to assess the perceptions and attitudes of the participants in this learning environment, having one individual who previously commented on the overall quality of the interviewing guides did not pose a significant threat to the data or the analysis of this data. In fact, this individual provided particularly valuable information for this study because of his unique standing in being enrolled in these courses and working with the researcher through the entire study process.
Instrument 1--Focus-group Interview Guide

The form of the focus-group interview is dictated by the objectives of the study and the pragmatics of the setting. Patton (1990) suggests that focus-group interviews can typically run a maximum of 10 questions in the course of an hour--a time length he sees as a reasonable starting point. Thus, a collection of ten, open-ended questions were formed around a general guide that attempts to elicit evaluative responses of the interactive videoconferencing environment relevant to the constructs of attitude and perceptions is the instrumentation goal (Appendix A). This guide dealt specifically with preferences on course delivery, affect concerning like/dislike about videoconferencing in general, improvements to the technical system, benefits videoconferencing brought to bear, proxemics affect on the experience, personal satisfaction and contribution to the course, suggestions for the course and delivery systems involved, reasons for choosing traditional or videoconferencing over the other, and community development as a function of the course.

Instrument 2--One-on-one Interview Guide

Potential problems that might be introduced by a lack of interviewing skill can be reduced in significance with the quality and types of questions allowed (Lincoln & Guba, 1985). Because of the open nature of the general interview guide, the number of questions that can be asked are somewhat limited, though more can be addressed with an individual respondent than with a focus group setting. The utility of the one-on-one interview is in the ability to follow up and to probe. The guide serves as a starting point to determine the overall attitude and perceptions of the participant. The follow-up questions function as a tool that
permits an exploration of the rationale and the "why" in the minds of the participants. Thus, the result is a general guide of twenty questions that were intended to allow the researcher to explore issues pertinent to the program being studied (Appendix B). These issues were related to personal backgrounds, reasons for enrolling in the course if they were a student/teaching through the medium if instructor, knowledge level of the technology systems before entrance into the course as student/instructor, past experiences in mediated settings, effectiveness of instructional choices for the medium, role playing their own use of the system as an instructor/student, feelings related to interaction through the medium, approach to viewing the monitors, options of controlling media choices, attitudes toward other technologies, and soliciting questions participants had related to the videoconferencing system.

**Controls for Error, Validity, and Confidence**

Since this study was contextualized in a particular environment, it cannot in the true sense be generalized. However, the aim of the study was to allow those involved in the design and usage of instructional videoconferencing to see a situation and extend to their own. Thus, the study findings cannot be generalized to other groups, but this report was intended for others to use in looking for similarities and differences between their situation and this one. The intent is for designers and users of instructional videoconferencing who are concerned with adult education at its various levels to look to this study as one that has analyzed a working system. In order to accomplish this desired utility, there must be a plan to control for error and establish validity and confidence in the findings.
The plan for this project was in using the four-pronged method for data collection as an attempt to control for error. By examining data from two types of interviews with documentation from participant observation and assessments based on videotaped sessions, the ability to give the reader a sense of the full picture is more likely (Geertz, 1983/1988; Patton, 1990). Through this strategy in the following chapters, the reader has been alerted to potential error.

Because of the formal nature of the program, the ability to control the type or number of students in a particular course, the information relayed in a course, the quality of the facilities or any other outside factor that might affect the results of the study were outside the realm of control by the researcher, though not necessarily out of the realm of influence. The researcher in this setting was not permitted to make any changes in the formal curriculum schedule, but suggestions and changes as to how to deliver certain curriculum were provided and at times followed. Thus, the only controls in this particular study design was in the collection and evaluation of data.

Control of the evaluation of the data is a very important factor in this type of study. The threat of researcher bias in the assessment of data is a significant threat if the researcher does not make an attempt to alert the reading audience of his or her personal perspectives (Krieger, 1990; Thorne, 1983/1988; Wax, 1983/1988). The findings chapter includes a description of the researcher’s personal viewpoints that contributed to the creation of the field notes and conclusions. Since these preconceptions, and other threats on the validity of the information imposed by the researcher all can skew the resulting analysis away from observation, the use of corroborating material is important.
Videotaping both ends of the videoconferenced session was one way to collect corroborating information. The videotapes served as a check against the field notes of the researcher and as a comparison tool for the individual participants. If a respondent stated that s/he felt free to ask questions, then the tapes revealed if the person actually asked any questions. If s/he did or didn’t ask any questions, the information was valuable because of the greater ability to draw conclusions from the additional data.

The information relayed in the formal interview settings required that some consistency in the types of questions be asked. If each individual participant responded to a series of entirely different questions, then the utility of the information relayed is diminished. However, the participants needed to be permitted to reveal the information they felt was most significant as it related to the instructional videoconference. Open questions designed in a thematic fashion afforded the researcher the ability to obtain the needed information.

Because of the qualitative nature of this study, statistical non-response error is not a concern. However, knowing why individuals elected to participate or not in the interview stages of this study was considered important. All individuals who were asked (all participants in two courses—i.e. technicians, students, instructors) agreed to participant. No one refused to be interviewed. However, several times respondents asked that certain comments be considered “off the record” because they felt that it may be “too incriminating.” On at least two occasions, scheduled interviews were canceled because of emergency situations and were not able to be rescheduled because of travel itineraries. Thus, out of the potential pool of 3 instructors, 15 students, and 5 technicians, who were
directly involved with the courses, 21 were able to make comments about the program.

The reason that so many responded positively to the process was because of the potential to have an affect on a portion of their educational system. At each introduction the researcher was introduced as a person who might be able to help improve the videoconferencing system. Everyone seemed amenable to making the system better, though some were resistant in committing to specific times.

Timeline

The pilot study was conducted the winter quarter of 1993. One instructor in a videoconferenced course agreed to allow this researcher to regularly participate in the course throughout the quarter for the expressed purpose of data collection and research methods evaluation. Once the pilot phase of the study concluded, the major phase of the program began spring quarter 1993. All data collection was completed by the end of the spring quarter 1993.

The first phase of the project, a field test to determine the face validity and overall utility of instrument designs, was conducted in conjunction with a course on instrumentation design and data collection. This course, along with the expert reviewers and solicited respondents, allowed for adaptation and improvement of the instruments before the pilot study was initiated. This illuminated problems of having too many "yes/no" answerable questions in the interview schedules, difficulties in arranging times for interviews, and difficulties in making sure the instructors were aware of why someone was wanting to study the course.
Each of these problems were discussed with various members of the academic community in an attempt to find solutions. More open questions were constructed. A personal, individualized strategy for scheduling times was developed and implemented. More communication with faculty members was deemed necessary and practiced through face-to-face meetings, e-mail, telephone, and memos.

The pilot study phase began with examining a single course over a full quarter. This pilot functioned as an issue raising and acquaintance tool for the researcher. Since each potential course taught over the link varied tremendously in terms of group composition, course topic, and instructor competencies, the course for the pilot study was selected through a process of elimination based on which courses were accessible according to time from among the others being taught in the quarter.

Going through a full quarter for the pilot study was necessary in order to guarantee that any unforeseen problems along the timeline of the full study can be sifted out. One problem that emerged from this process was recording the sessions on videotape. Frequently during the pilot phase, technicians would forget to begin the videotape recording, would have sources other than the videoconferenced courses routed to the recorders, or fail to have the correct patch cords and filters hooked up to allow both video and sound to be placed on the tapes.

The only way found to resolve this problem of making videotapes was to enter into the booth early, cue up the tape myself, and start the recorder before class actually began. This still required that I ask the technicians if the signals
were routed properly and to stress the importance of the tapes. They complied and the data collection for this method in the final phase worked more smoothly.

Two courses were studied in the final phase of the data collection. These different courses provided a diversity and richness not available in a single case study project. Although this was not a comparative study, the ability to have participants respond to the same questions within the same mediated setting but with different instructors and content helped affirm conclusions across the specific cases. Fuller descriptions of these courses follow in the data reporting chapter.

Logistics

The logistics for this study required 1) being admitted into the courses, 2) selecting respondents for the interviews, 3) developing trust between the researcher and the participants, 4) gaining permission to record comments and interactions on videotape, audio tape, and written forms, 5) conducting the interviews, 6) participating in the course, and 7) analyzing the data collected in the context of the specific setting.

Admittance into the courses was accomplished initially through contact with one administrative person with significant influence over members of the faculty. He suggested several faculty members who would be interested in the project. Individual contact was initiated with the recommended instructors of the courses. The researcher explained the objectives of the project to these individuals and the potential benefit of the research to their on-going curricula. Once admitted, the researcher contacted the other participants in the videoconference.
A list of the participants was necessary so the researcher could determine who was a registered student, who was sitting in on the experience, and who was a paid staff person to manage technical concerns. Once the names were sorted, the researcher made initial contact with the potential respondents.

Part of the building of trust in this type of socialized environment is to show a genuine interest in the welfare of the participants and the process (Thorne, 1983/1988). This was accomplished in three ways. First, the researcher was introduced to the course through formal introductions conducted at the start of the quarter. Second, a written letter was given to the potential respondents explaining their course has been selected as a site for data collection. This document was delivered through both electronic mail and typed letters. Third, the researcher participated in the course on an on-going and regular basis.

Since respondents were necessary for two forms of interviews, incentives seemed necessary to ensure people felt like contributing (Norland, 1992). For the focus group, the proposed incentive was the participants' ability to improve the current videoconferencing system. Likewise, the incentive for the individual interviews was to rely on the personal relationship developed with the interviewer. Additional incentives such as food or drink were offered, but seemed to do little to affect participation.

Only one individual conducted the interviews, so training of multiple interviewers was not a concern, but consistency was a concern. The interviewer attempted to ask the same types of questions in the same context. This worked well in the context of the focus groups. However, the individual interviews showed a remarkable ability to vary off of the script. Because of the range of
responses and the corresponding directions, it was deemed necessary to keep an interview guide and use a check-off system when an item was covered.

The interview sites also used a recording device (either audio or audio/video). Each participant was asked if it was permissible to record them in the conversations. Since the topic of the discussion was the videoconferencing experience, the amount of risk involved to the respondent was reasonably low. But as stated earlier, some still showed reservations about making certain comments. All respondents were assured their comments would remain anonymous and everyone, after some persuading, allowed themselves to be open with their comments. No real names or descriptions were used in the following chapters that could lead to identification of the people making the comments.

Analysis

The chapter reporting the data mirrors the sections of the introductory chapter with some additions. Namely, the areas of staging, shot selection, turn-taking, lighting, camera-monitor-subject relationships, time utilization, audio management, instructional strategies, and physical and social maintenance of the instructional videoconferencing environment will serve as organizers to facilitate about the videoconferenced course. Excerpts of responses from interviewed respondents and observations made in the field as a participant observer were arranged under these specific headings as well as in the areas of presence and technophobia/technomania that emerged out of the naturalistic process. The face-to-face and group interviews were used by the researcher to look for continuity and discontinuity in ideas and thoughts expressed in different ways.
This process of organization and interpretation posed an intriguing dilemma. If a researcher begins by looking for similar thoughts, then the analysis of the data may have an unnecessarily imposed frame that limits the interpretation of that data. However, a researcher must also make sure that in the interview setting, if certain themes seem to be emerging, the clarification of those themes are addressed in the interview. Clarifying questions, follow-up questions, paraphrased responses, and recycled questions all served in determining the researcher obtained what the participant was meaning. So, the first stage in the analysis of the interview data actually took place at the time of the interview.

The responsibility of the researcher/interviewer was to help guarantee clarity by providing the interactions so as to allow the reader to be a witness to the activities viewed by the researcher (Geertz, 1983/1988; Thorne, 1983/1988). If this was carried out, then the potential for a contextualized appreciation of the reality portrayed in the analysis is increased (Thorne, 1983/1988; Wax, 1983/1988). Again, the researcher must not impose any restricting frames on the content analysis of the information. This meant the researcher must take care to document those themes, ideas, and similarities with meticulous care. Merriam (1991) suggests that the qualitative study should reveal to the researcher the direction and analysis of the data being collected.

The analysis that follows is one that should be transparent and cohesive (Patton, 1990; Reinharz, 1979, 1992). In other words, if another individual were to go into the same setting, this person should come away with an understanding that makes sense according to the backgrounds of the researcher and the participants. By using the list of issues that the literature states are relevant to the
design and implementation of the instructional videoconferencing setting along with the real attitudes and actions of the members of the instructional videoconferencing setting, a comprehensive and useful guide to the instructional videoconferencing experience can be produced.

Sample Data

The following section is a transcribed excerpt from an interview with a 40 year old, white American male who is a doctoral student in one of the departments of Agriculture. The seminar course in which this student was enrolled was the first course this person had taken that implemented two-way interactive videoconferencing. However, he had been involved with other mediating technologies such as traditional instructional television (ITV) college level courses.

Following a brief introduction where the student answered questions concerning his personal demographics and reasons for being enrolled in the course, he willingly responded to the following questions. Comments that begin with initials ME will identify the interviewer, comments labeled with HS will identify the student’s answers to the questions. Two columns were used to facilitate what happened in the interaction. The left column contains the actual interview excerpt, the right column is a short description of this researcher’s interpretation of what was being said and is set out with italics.
ME: If you had been given a choice of taking [this course] in videoconferenced medium or in a face-to-face environment which would you choose?

HS: I much prefer face-to-face.

ME: Can you tell me a little bit about why you would choose...

HS: I guess it is because of some early experience I had back in the 70's, the media was basically television classes in mathematics and zoology, they left a very bad taste in my mouth. If you don’t understand what the Prof. is talking about, then you can’t stop the tape to ask questions. There were TAs standing there, but you had to more or less where your question was and go beyond that and try to pick up the rest of the lecture...which usually wasn’t too much of a problem. But sometimes you would get lost and not understand anything in that... 

*Here the respondent begins to describe how his own personal history and experiences with technology had shaped his views on new technologies he might face in the classroom. Even after almost 15 years, he maintained a fairly strong disdain for new technologies. The reason he disliked this technology so much was due to his inability to interact with the instructors of the course.*

*He seems to indicate that the reason for having interaction is for clarification and confirmation. He describes feeling almost lost at times.*
... I guess just due to experience, I do not like those kinds of settings. But it is kind of funny, I don't mind watching a videotape because you can stop it, back it up, watch the part again. Again, it is not my favorite media ... the nice thing about this (the IV link) is that you can ask questions, albeit over a distance. At this point we have not had a lot of the seminars originating from Wooster, but there has been a good deal of interaction. We are a far cry from the primitive media of before, but it is still not my preferred medium.

ME: ... Do you think the presenters over the videoconferencing network have been doing an effective job of using the network?

HS: I am not exactly sure how to answer that question. I don't know--the way I would answer that is whether they were effective in with the tape. This was frustrated because he was not given control over the tape player. Therefore, if he had any questions, there was no way to halt the dialogue. He does acknowledge advances in the instructional media, but still maintains his earlier dislike.

Here the respondent indicates a bit of discomfort with evaluating the technology. He relies on his own common experiences and compares...
presenting their presentation in the first place. I don’t know how to
distinguish between what the special concerns of the videoconferencing as opposed to one-to-one to effectively use it or didn’t use it. I would simply judge it on whether they presented an effective program or didn’t. On that basis, they were effective in that I was able to pick up new information. However, in the turpines talk, well let’s go to the pickles talk. It was fairly easy to pick up with processing-in the turpines, I could follow it to a certain point. About halfway through forgot who his audience was or he was selecting an audience. He got to a certain point and addressed specific audience...--to a degree it was less effective.

ME: If you were to give yourself a rating in terms of your own knowledge about technologies in education like this videoconferencing presentations over the link with those of other classes. The criteria that he uses to evaluate is in the organizational style of the presentation and in the newness of the information. He asks three basic questions: Did it make sense to him, did it teach him anything, did the presenter know who his audience was?

{Several commented during each of these talks differences in presentation style immediately after the seminars--the class is basically trained to hone in on whether the presenters accomplished their stated objectives.}
network, where would you rate your own knowledge base and experience with these technologies?

HS: Experience with them I would rate fairly low. I have some...let me back up, anything related to computer searches, new technologies related to getting data, information, what have you. I do have expenses in for a SONET card for my computer here. Knowledge background is a little better.

ME: Do you plan on going into a university setting when you get out of school?

HS: If given a choice, I would say yes.

ME: Given your experiences, would you intentionally plan to use these technologies in the classroom?

HS: I would use whatever I thought was effective. I would use a new technology after viewing it and evaluating it to see if the students

The respondent is hesitant to show confidence in his ability to evaluate the medium, but begins to assess his own knowledge and skills and makes an effort to gradually raise the level of his competence with new technologies.

Here, the researcher tries to have the respondent role-play out what he might do in the future.

Again, the criteria that this student uses to evaluate a new technology is the direct benefit to learning. What can new technologies do for the students more effectively than traditional delivery methods?
could get any benefit, even if I didn’t understand how it worked at the time I would talk to somebody who could help me out.

ME: In the class we are in now, how has the interactivity affected your contribution to the class as compared to yourself in a traditional environment?

HS: I think it is easier for me to hide out when the person originating the discussion is in Wooster. It is easy to imagine you are listening to a radio. I feel more comfortable not having to contribute if I don’t want to contribute.

ME: Do you get a sense that the students at Wooster are your fellow students or just another group in another place?

HS: I don’t know how to answer this question directly, because these are not people I normally interact with. Again, I know them to say, “Hi” to

He also displays a willingness to learn about new technologies that are beyond his understanding.

Here, the respondent begins to outline a significant difference in interaction and turn-taking that is presented by the IV course. He feels more able to withdraw and less compelled to speak if he doesn’t want. {This student-along with several others routinely sat in the last row furthest away from the two principal monitors and the camera. The respondent indicates here that what determines closeness or togetherness is not the interaction, but proximity. Are the people there
but because I don't know them like I do the people here, seeing them on the monitor does not make me feel like they are a part of the group I am a part of. It is almost like seeing a picture of someone's family on the wall. The more I know them, the more that feeling dissipates. I would say there are other factors that play a bigger role than the link itself that have a bearing on that answer.

ME: Would you say that you attend to the monitor like you would a professor in a regular class or like watching Star Trek in the evening, or do you even see a difference?

HS: Well, there is a difference, I think concerning the content (chuckling). As far as I can tell I come to it with the same focus and intensity if he was here in the same room. I would have to think about that some more, but my gut feeling is that I am the same.

He goes on to further describe the ability to distance himself from the people at the other end because of the transmitted image as opposed to a face-to-face encounter.

[follow-up necessary here]

The respondent indicates that the content of the type of programming affects his viewing style. Not the situation itself. Thus, the technology is viewed as useful to this student for learning as long as he understands the purpose of the viewing.
ME: If there was a class you wanted to take and it was being offered over the network, would it make a difference as to whether you would take the course or not?

HS: Probably not. If it was a course I was interested in, I feel that I have enough give and take, if I wanted it, that I would be able to get most of what I wanted. So, I would take the course.

ME: Why do you think the videoconferencing network was created?

HS: I think they are trying to do more with less-like everybody else. Every university is running out of funds. I would view it as an opportunity to regionalize in specialties or even courses, then transfer those courses to another university. Certainly that is more involved and complicated than what we have set up, but that certainly

The respondent reinforces the notion that the medium would not keep him from learning from the experience, nor would it keep him from taking a course.

This response poses an interesting reaction. He sees the main function of the technology as being a cost saving measure. The potential is there to have the student believe that he/she is being shortchanged. Since the person is not here, then I am sacrificing my education for money.
would be an option with dwindling resources. I think it is also good for the fact that this is a technology that offers you to do a lot of things you couldn’t do otherwise --if nothing else, it allows you to keep up with the Jones’ so to speak so you don’t get left behind. It certainly has a lot of potential, I had totally written off television TV courses. If I had the option, I would take a course like this. I would still prefer a one-on-one course if given the option. But this is enough better that I would do it if it was something that I was interested in.

ME: So, the difference, then between the current videoconferencing system and the television experience you had in the past is what?

HS: The main difference is that you have access to the professor as he is going along, obviously in a seminar

The respondent sees the real potential for this type of course being in the addition of courses that he could not otherwise take in a face-to-face setting. The respondent adds to the earlier feeling of improvement of the interactive course over the one-way ITV course he had taken in the 70’s.

The principle difference according to this respondent is in interaction. The ability to ask questions is an important factor to this student.
type setting, it is not set up that you interrupt him, but in the classroom setting that option is available.

There is the personal interaction that saves it, where television there is no way to interact and be responsive to the environment you are in.

ME: If you were given a free hand in changing the system, what improvements would you make?

HS: I guess I don't know how to answer that, my answer would mostly be based on what is available. I would give you all kinds of pie in the sky stuff if it were available, but I prefer to keep my comments as to what is reasonable concerning the technology. I would prefer to see both pictures of Wooster—the people there, the instructor, slides, and whatever he is using. Anything that brings them into my living room as it were, brings it in a more personal basis. Anything you can do to

{However, this student only asked one question in the first five sessions of the course}

The respondent qualifies his response according to what is cost effective. But the way he would like to make it better is in the personal nature of the interaction. Making the presence of the instructor more “real” seems to be what the respondent is trying to indicate. By encouraging larger screens, and seeing both the instructor and the other students is of significance to this respondent. Having a choice in who to attend to in this situation is implied as important.
Though only a segment of one interview, the questions asked and the responses provided indicate both the richness and the difficulty with the process. There are several times when more in-depth probing would have helped in the data collected. Some questions were asked in ways that may not have been clear as to
their reason. However, the respondent was very willing to answer all questions and the richness of the responses can be combined with corroborating observations to give those in the area of distance education a more complete look at the participants in this setting. Ultimately, the question to be answered using these type of data is what insight do these responses provide?

There are some conclusions about this individual that can be made based on this person's responses. Because the student had been exposed to older uses of instructional television on the college level, he carried in a negative experience that seems to be related to the fact that he was denied access to the professors of the courses. This access or interactivity was an important point for the interviewee. However, in my observations of his activity in the class, the student asked only one question in the course of the 5 presentations that had been delivered over the videoconferencing network at that time. He was content to sit and listen to the instructors/presenters ("like listening to the radio") and did not feel the need to interact with the other students or instructors. However, it is clear in the above responses that it was not the actual interaction, but knowing that interaction was possible, if necessary. Having access was important, using it apparently was not as important. The ability for this person to have some say in the functioning and design of the course by asking questions or making comments generated the sense that he was involved in the course.

The fact that his changes would be to personalize the technology by making the screens bigger and wider, for instance, displayed an acute awareness of the need to make the system more like being with real people. However, in spite of an acknowledged dislike of the current state of the system ("barely
acceptable"), he displayed a tolerance of the system and a willingness to re-enter a course if it were to be taught over the network, though he would not re-enter a course using a one-way video system. This adaptability to the environment strikes me as an underestimated aspect of the learner in higher education.

What we learn from this one individual is that the current interactive system works for him, but somehow seems to fall short of what he sees as its potential. This falling short seems to be related to the ability of the medium to emulate a face-to-face encounter. Since screens are apparently too small and there is little contact with the other class members at the different site, this student expressed a view that he was not very satisfied with the overall process. However, he also was not willing to discontinue this form of education delivery because of the ability of the conference to allow for interruptions, questions, and comments, whether or not that ability is exploited.

The following data section presents a synthesis of all respondents' perceptions and illustrative comments that support my observations in a similar format as above, except that multiple respondents are included under a single topic heading instead of individual interviews strung together one by one. This seemed the most reasonable approach given the volume of data and the number of issues discussed. The same two column format is used, but breaks in this format occur when extended interpretation or observations made in the field seem pertinent.

The difficulty that arose when reading/analyzing/reporting the field notes, watching or listening to the tapes was in the selection of which comments to include. There are roughly forty hours of class time on videotape (multiplied
times two since both ends of the videoconference were recorded), 450 minutes of audio tape, and literally hundreds of pages of field notes recorded during the study that served as a mental reminder and diary of observations and thoughts concerning the process. The overall content of the comments from the conversations in class, the face-to-face interviews, and focus group discussions was rich and deep. Attempts at changing the existing videoconferencing system during the project were somewhat frustrating with only incremental changes in the implementation of the videoconferencing, but may have been limited to the time involved. How does one condense these into a form that is both readable and useful? The approach taken here was to select comments and situations representative of what seemed to be taking place in the environment and to provide an interpretation for the benefit of the reader.

Following the data section, a discussion section will recommend changes and provide a contextualized answer about how instructional videoconferencing might be made more successful from the perspective of these users. The conclusion discusses limitations and strengths of this study and attempts to point a direction for further work in instructional videoconferencing.
Chapter III
Data

Introduction

The following section is written in a style atypical of many research results sections. This is not a list of tables or a breakdown of factors isolated through a one-time survey. It is a combination of a narrative and a two-column reporting style that provides a context of the observations by the researcher and perceptions from the researched concerning the videoconferencing environment. As mentioned previously, these data are organized topically to allow the reader an opportunity to gain a more complete understanding of the various components of this particular study.

No names of individuals are used in this report in order to protect their privacy and to comply with the agreements participants signed who were involved with the data collection phases of this study. The actual titles of individuals were not used if there was only one person that fills that position. In these cases, a simple statement as to the level of the individual is provided. All statements reported are taken from comments recorded through videotape, audio tape, or transcription into a laptop computer during the conversation or were written comments sent through regular campus, US, or electronic mail. The following is a description of the shorthand identifiers used in the following reports from the two courses.
A stands for administrator, F stands for faculty, T stands for technician, and S stands for student. This is the general pattern. To further identify the respondents, the specific shorthand works as follows: administrators = A1 (an upper level college administrator), A2 (staff/departmental administrator over technicians), and A3 (department chair); faculty = F1, F2 (seminar faculty), F3 (international course faculty); outside faculty (those not responsible for the ongoing activities of the course but maintained contact with them either as guests or consultants to the teaching faculty) = OF1, OF2 and OF3; technicians = T1 to T6; students = S1 to S7 (Male students-seminar), S8 to S10 (female students-seminar); IS1 to IS5 (male students-international), IS6 and IS7 (female students-international). If comments were made during a focus group session, FG1(seminar) or FG2(international) precedes one of these earlier identifiers. The researcher is referred to in the shorthand as ME.

Though this system eliminates some of the personalities of the individuals, there is information included that can lead the reader to an assessment of the activities of the two courses. This assessment aids in the overall understanding of the interpretations provided in the right hand column in italicized print. These interpretations lead to the final recommendations and conclusions for the project.

Because of the nature of the reporting, the first person has been selected as the presentation style for the following chapters. This is in contrast to the first two chapters which are written in the traditional third person for the convenience of accommodating academic writing. The researcher, as used in the first two chapters, in the following sections is replaced with me or I. I think you will find the following data more compelling because of this change.
The History

A1: When OARDC [Ohio Agricultural Research and Development Center-author] became a part of Ohio State, we needed to find a way to have the instructors in Wooster have more time for teaching. We had them drive down to Columbus periodically, but [a higher level administrator] decided that we needed to set up a videoconferencing system. I sat down and figured that if we purchased a van, complete with a television and VCR, a coffee maker along with other amenities, and hire a driver to shuttle the faculty back and forth five days a week so they could spend the time in the van for class preparation, reading, or even sleeping, it would actually be cheaper to buy the van. But [he--the upper level administrator] decided that videoconferencing was going to be cheaper. This was my first contact with the history of the development of the project, I was inclined to accept this account as being relatively complete. However, during the course of my research, others came out with interesting additional perspectives on the history of this project. What this did show me was that this administrator, even though he had taught over the net, still recalled a strong position that was against the general idea of spending money for distance learning. This point was in contrast to some later, but reflected an attitude fairly prevalent in the system, as will be shown in later comments.
be the way we would go.

After I had talked with the administrator, I began to expand my contact base with those involved in the delivery and maintenance of the technology. I began to spend time talking with the producers/technicians.

This television producer saw the videoconferencing system as a way for his department to get more facilities and more equipment. The first administrator saw the link as a way to allow faculty to get back and forth to the Columbus campus without needing a van, this person saw the link as a way to get more space and equipment.

Another administrator saw the system as being ill prepared but
only knew what had been requested and had to come up with ways to make it fit. If we had the funds now, we would do a lot of things differently, but with the budget crunch, we will have to make do for awhile.

[Chairperson speaking from Col.]

A3: It is time for the faculty to start working as a team. How come we have had several empty slots on the link. Where are the faculty presenting their research to their colleagues?

functional. He was not present when the system was finally put in, but after the fact he was aware of numerous errors in design. He still saw the system as functional.

Because audio/video consultants and engineers were not used (even though there were several associated with the university at the time of the videoconferencing design) the rationale for getting into the business of providing two-way interactive audio and video was not to be a leader in the education industry with new technology, but simply to fill a niche the department saw as important.

This was an encounter during a meeting that was scheduled for what was normally a class period. The chair elected to hold a faculty/staff meeting and not use the time to present research data. The chair spoke for most of the sixty
OF1: Isn't it time just to give up on trying to use the videoconferencing link to make us equal. Why don't we just try to further outline the responsibilities of each person in a way that is fair. For six years we have been trying to get everyone to work together, but nothing has changed. They get to do more research, while we have to be the ones that spend the time advising, teaching more classes, and basically we are evaluated on the same criteria. All that happens is we get upset with one another. A3: It is those kinds of attitudes that I am talking about...if we think we can work together we can.

I was struck by the candid nature of the comment, given the mixed audience and myself recording the event. What was even more remarkable to me was the chairperson's response -- a rebuke that cut off interaction. Exactly the opposite of the chair's stated desire for the link. What seemed clear to me was the notion of we-them. There was a significant division in the views of the faculty at both places, and the faculty apparently saw the videoconferencing link as an attempt to simply add more work onto the people at Wooster and not distribute any of the responsibilities.

minutes that were allocated to the class. The link expired, but the meeting continued with just the faculty, staff, and students from Columbus.
Mike, since you are not a part of this department, what were your impressions of the meeting?

ME: (Surprised that I was asked, I thought for a moment and gave my opinion.) The chair did not seem to say anything concrete as to how to make the group become more united. It seemed like a positive thinking seminar without very positive thoughts...I found it ironic that the chair asked the faculty to be spending more time presenting their research over the videoconferencing link and he didn’t know how to use the system.

S1: Yeah, I thought the use of strong arm tactics was a bit much

S10: I felt as if I had been chastised, but I didn’t know what I had done wrong. There was no good reason

In the class period immediately following this meeting, the instructors were most interested in recapping the events of the meeting. One of the first questions was pointed to me.

The fact that I was asked one of the first questions showed that my method of gaining entrance into the course had been successful. The instructors and students were interested in hearing my opinions about something close to their own emotions. The meeting with the chair and after illustrated how divided the opinions of the faculty and administration were with respect to the history and reasons for the existence of the link. The chair wanted more participation in meetings using the link, but he
for that kind of treatment.

S2: Well, you have to look at the management style of the person. He doesn't have the best approach to dealing with difficult issues.

F1: Well, he still doesn't understand that there are real differences in being in Wooster and in Columbus. We ought to simply accept that fact and make the best of it, not pretend that attitudes alone will fix it.

Following up this thread during face-to-face interviews with faculty --

ME: Why do you think the videoconferencing link was put into place?

OF2: I have memorized every inch of 71 [the interstate that runs between Wooster and Columbus-author] and if I pass a particular bridge, I can look at my watch gauge whether I am 10 seconds behind.

...fumbled around just trying to figure out how to use the overhead projection system...

The link was seen by the chair as a way to make the department more unity, but the members of the seminar class saw the link as potentially doing just the opposite. Mainly, through a misapplication of control. The administrators, including the chair at this point, wanted to use the link to maintain order and control as they saw fit, not as the participants saw the design for the link.

This faculty member clearly saw the link as alleviating some of his driving time. An efficiency view of the reason for the link's existence. However, this was just a portion of his and other's views.
OF2: I suppose that one of the reasons it was created was so we could spend more time in the classroom. Although most of us have only a 25% appointment in teaching, it is difficult to schedule some classes with so few students on this campus.

F2: There were a number of faculty hired to work on the OARDC and there was an understanding they would need to travel down to Columbus, there was an announcement that the faculty would now have a chance to offer their courses over the videoconferencing link.

Students in face-to-face interviews:

S1: Well, I think the link was created to save money, do more with less.

S4: I think the link’s main function is to allow members of the faculty

The convergence of responsibilities of OARDC and the Ohio State University led to a situation that did not sit well with all of the faculty members. There are attitudes still in place at least 6 years after the first uses of the videoconferencing link and some ten years after the purchase of the research center.

Even students were aware of the various dimensions of the history surrounding the link. Efficiency models and views of research equity were perpetuated by the students.
to be able to stay competitive in their research while carry on certain responsibilities here [Columbus].

S9: I think they can offer courses they couldn’t offer ordinarily. I would like them to be able to offer even more, but it does function to give us more selection than we would have ordinarily.

FG1(S8): I think that the link allows us more choices. There are courses offered that we couldn’t have had, otherwise.

FG1(F2): Probably the best thing about the link is that we can have meetings and do research seminars without having to drive all the way down to Columbus.

FG2(F1): To me, the most effective use of the medium is to conduct faculty meetings and not have to
spend a full day in travel time to spend one hour talking about political issues.

The thought that the videoconferencing worked most effectively in the context of meetings seemed a dominant view of the faculty. The students did not refer to this as a function, presumably because they had not been exposed to videoconferencing as a regular meeting medium. This was one of the few very positive comments made about the system.

There are at least five reasons for the videoconferencing link being in existence based on comments from the interviews, conversations, and observations. Reducing travel costs, saving time, creating equity for faculty in inequitable positions, helping to reduce tensions between the two sites, and offering courses that could not otherwise be offered are all possible options. The fact that it may be used as an equity building tool seems to have simply made both sides upset to some degree. The faculty and staff at Wooster and Columbus simply see themselves as having disparate responsibilities and the link is a reminder of that fact. Consequently, tensions are at least the same or possibly even more antagonistic toward one another than before the link’s introduction.

However, the faculty do agree that the link is a useful tool in the conducting of business meetings and for the sharing of research information to one another. The students bring out the positive aspect that the link provides them
opportunities to take classes they probably wouldn’t be able to get otherwise. These factors, both positive and negative, figure prominently in the development of this system and how the individuals work within the system. One glaring example of the sometimes confused rationale and approach is evidenced in the implementation of the video classrooms.

The Video Classrooms

ME: Where are the video classrooms located?

A2: These rooms, we call them television classrooms, are in two places. One of them is here in Kottman Hall, room 244. We use it for the classes as well as a studio for production work for things like the beekeeping course. The other one is in Wooster, at the site of the Ohio Agricultural Research and Development station. That room is not as heavily used as this one here, but it does see a good deal of activity.

[We traveled down the hall and visited the classroom in 244]
The nameplate outside the room reads “244-Television Classroom.”

The door is large and set at an angle from the wall.

A2: You can see that there is an awful lot of stuff in here, but that is a function of how heavily the room is used for the purposes of production work. For one of the classes, there are as many as 50 students, so we have to borrow chairs, bring them in just for that session, and then put them all back after the session is over. That class meets three times a week when it is offered and that becomes a job. You can see there is barely enough room to fit 30 chairs, let alone 50.

My visit to the room used for video classes on the main campus was not as I had envisioned. I have been involved with a number of videoconferencing sessions and had seen quite a variety of arrangements, but had never seen one like this room. The building is known as Kottman Hall and is a recent edition to the agriculture campus. It stands apart as a contemporary work of architecture in the midst of the institutional style buildings in the vicinity.

My expectation before opening the door, given the overall newness of the building and the specific designation of this room, was quite high. I opened the door and entered in the back portion of
A2 introduces me to T1, who later tells me more about the studio in a casual conversation about the room.

T1: We use the platform at the front if we are shooting seated figures for a production of some type—similar to the AgriTrends show we do, but we usually do that over at OSU (referring to the local Public Broadcasting affiliate—WOSU). We keep chairs and stuff here [pointing to the side]. We use the bookshelves and the other props from time to time, but there is no other place to keep them so they stay in here. The equipment is getting old, but we still use it. The camera that needs replaced the most is the cart camera. It's about had it.

The technician showed me around and through his comments and gestures he seemed to indicate that to him, the most important aspect of the room was its ability to be used for projects that were more like TV. Being able to create and stage sets, doing real shows as opposed to the classes. The fact that the bookshelves contained cardboard boxes printed to look like books and sat in the classroom in open view gave me an impression that I was somehow being deceived by all this.

The technician was aware of shortcomings of the room, but he made a point to show that there were positive aspects of the room.
Personal observations and measurements provided the following description of the "television classroom" in Columbus. There is an eight inch raised platform, four feet deep, that extends the full width of the room with a ramp leading up to the platform on the left side of the room. On this platform was a small desk, a set of narrow bookshelves with false books, one podium in the center, a rolling cart with a pole-mounted camera focused on a platen on the cart, and numerous lines of cable, boxes, and other assorted clutter. The two sidewalls of the room were lined with dividers, seats, backdrops, one camera on a dolly, and several other pieces of staging items. There were 40 chairs arranged in five columns with eight rows. The chairs were 4-legged student chairs with most having writing desks mounted on the right side. Two chairs had a writing desk on the left-hand side of the chair. The chairs were arranged with no extra space in the columns and just enough space between the rows to allow a medium sized person to walk though with some maneuvering necessary. In the rear of the room sat two tables filled with large amounts of audio/video accessories. Two dolly-mounted cameras also lay dormant in the rear portion of the room. Very little floorspace was available for walking (See Diagram 1).

The ceiling seemed equally as cluttered. The ceiling used a dropped fiberglass panel ceiling, but a number of the panels had been removed to accommodate wiring and other audio/video hardware. Four lavaliere lapel mikes were hanging from the ceiling, roughly set at points one-third the length of the walls away from the walls (a most curious design, I thought, having never seen neck mikes hanging from the ceiling. Also, self-canceling desk mikes designed specifically for videoconferencing had been available for some time) Older RCA
25 inch television monitors were mounted from ceiling anchors at the front left and right corners of the room and one was hanging at the rear right of the room. The monitors were cocked at a slight negative angle to allow more comfortable viewing from the student desks, but when I sat down and viewed the monitors from these desks I felt as if I would need some kind of a prop to keep my head in the correct position for extended periods of time. Next to the front left monitor and the rear monitor were video cameras on motorized mounts. These were remote controllable from the booth.

The initial impression of clutter and overcrowding that I felt the first time into the room did not change in three quarters of contact with the video classroom. Items were moved around from time to time, but the room always contained the same amount of material. The other video classroom was used less frequently and contrasted significantly with the main campus.

Wooster--Focus Group Setting

FG2(T6): The room here is pretty nice, I think. From this perspective of seeing Columbus, it always looks kind of cramped, but we can't tell much from here.

FG2(IS1): I went down to Columbus for a class because I had to meet with some of my committee members and

This technician, who was an intern (Master’s Level), saw the room as being more than adequate. But his comparison is Columbus. Having never been to the Columbus site, he could only speculate on it’s design as it appeared on the monitor.

This student had a unique position in both classes. He was the only student to have experienced it
was very different. I like it better here.

ME: Why?

FG2(IS1): It is less crowded in here for one thing...

FG2(F3): I think this is a very nice facility, but I feel that we are falling behind. We are a major research institution and we ought to be leading the way in technology usage and development. To think that we have these old televisions and an outdated sound system seems ridiculous to me. There are other institutions with much less resources than us and are putting together leading edge kinds of systems.

ME: What other kinds of systems are you familiar with?

FG2(F3): Case Western, for example, has a whole campus that is ready for this kind of delivery. My wife is in the medical field and they both rooms. From his perspective, Wooster was better than Columbus. One reason he gives here is because of the crowding of the rooms.

The instructor, even though he indicates that he likes the facility in Wooster, is very critical of the university not setting the pace for development. Part of critique rests on the fact that through his wife he has exposure to another university that he perceives as pushing ahead at a much faster rate than Ohio State.

When he is pressed for specifics, he refers to his knowledge of Case improving it's delivery systems on the campus, but to add insult to injury in his mind is that
are already using technologies that they are trying to improve a system are way ahead of ours. In fact, they of mediated instruction which he are trying to plan for improvements perceives as already being better in to what they have now. A place as quality than Ohio State’s. large as Ohio State ought to be able to set the pace for these new technologies.

This description of the Wooster classroom also is the result of personal observation and measurement. The other room, located in Fisher Auditorium in Wooster, Ohio and also known as the “Television Classroom”, is thirty by thirty feet and displayed an altogether different feel when you entered the room. The door, instead of opening from the back opened toward the head of the classroom on the right side. The only objects in the room were the chairs, arranged in two blocks of ten with a three foot wide aisle down the center, another video cart identical to the one in Kottman Hall, the same model and basic arrangement of television monitors (except that the rear monitor was sitting on a wheeled cart instead of hanging from the ceiling), and partitions that created another room roughly ten by eight feet were in the back left corner to provide space for a control room (See Diagram 2).

Even though the room in Kottman was slightly larger, particularly if one includes the control room attached to the rear of the classroom, the platform and the props and equipment that surrounded the room made it seem smaller to me than the Wooster site. As seen in the responses, the participants at each of the locations reacted differently to their particular rooms. Personally, I found it
It was clear to me at this point, that even though the group was tolerant of the room, they did not like it. I felt it was necessary to get their ideas on improving the facilities.

This suggestion generated a large amount of discussion in the focus group. All of the members of the focus group felt that one of the big things that would help the overall environment of the videoconferencing experience would be to use a better room. Later, other specifics about the technology systems in the room will be covered, but here, they see the semi-circle design as being a big help.

difficult to find an outlet to plug in the laptop I was using to record my field notes because of all of the props and furniture blocking the outlets.

Suggestions about improving the room in Columbus from the focus group:

ME: So, given that you all don’t seem to like the room very much, what would you do to make it better?

FG1(S10): I think they should move the room downstairs, what is it, 110 or something like that....the room where the seats are already arranged in a semi-circle and each row is raised above the one in front of it. That way, you would be able to see over the heads of the people in front of you, you would be able to see other students... It would just be a big improvement.
FG1(S3): I agree, I think something like an amphitheater design would help. Besides, it would make it a lot easier to see the television. I get tired of having to stare up into the air to see the things. Maybe if we put it into a better room, maybe more people would be inclined to attend seminars.

FG1(S8): It would just be nice not having to walk around all the cameras and junk.

This particular student attributes occasional low attendance as a function of the room design. She then begins to describe orientation of the subject-monitor relationships. To her, the room inhibits feeling comfortable and does not facilitate proper viewing.

This summed up much of what I sensed during the focus group and in the class. The people would prefer to have a better room, but improvements were considered niceties, not necessities.

The participants at Fisher in Wooster were much less critical. The room is used regularly for classes, but does not see the level of studio production work as Columbus’ video classroom. This contributed to an overall neater appearance and the participants were pleased generally with the current room. The only complaints about the arrangement of the room concerned the location of the control room and the monitors hung from the ceiling.
In a face-to-face discussion:

T6: I worry sometimes that the control room is distracting to the students...the phone rings, noises come from the various editors and videotaping equipment.

ME: Has anyone ever complained about this being a problem?

T6: No, but I still am concerned, and personally, I feel a little inhibited at times not being able to do all the things that I might do if a class was not meeting in here.

The technician was very aware of the potential for distracting the students and was possibly annoyed by the fact that he could not speak in a normal voice when called during a videoconferencing session. While I was present the phone rang with a quiet chirp. This technician whispered to the people from Columbus who were calling because class was meeting at the time. None of the students paid attention to this distraction at all. No one looked back, no one stopped from copying down the notes.

These two rooms were the exclusive locations for all of the courses that emerged out of the College of Agriculture for the College of Agriculture. Some programs produced by the Agricultural Communications division and intended for a wider audience were frequently shot on location, edited, and were given a complete video production treatment. This generally was reserved for promotional programs or for the AgriTrends show. AgSat courses such as the Beekeeping program that finished just when I began my study of the system were
treated more as a television program than a classroom. There were elaborate sets built for the show, detailed scripts, several camera personnel and a director conducting a live broadcast. The teacher training course taught by the administrator was shot in the studios of the local PBS affiliate and was conducted the year prior to this study.

The Responses

As described in an earlier chapter, there were certain questions I asked most participants in an attempt to obtain information that would be directly relevant to a number of areas. These areas were outlined as time utilization, lighting, staging, audio management, shot selection, turn-taking, and camera-monitor-subject relationships (Acker & McCain, 1992) as well as instructional strategies. Each of these areas functions as topics for discussion. Implications of what was discovered through the interviews and class participation will be more thoroughly discussed in the following chapter. Following these eight sections are sections dealing with presence and technophobia/technomania—constructs that emerged through the qualitative process after the initial literature review process.

Time Utilization

Through the following comments taken from class and from interviews, the dominant question to be answered is why is the time being used as it is in this process. Thus, not only is how time was spent important, but the reasons for why it was used in the manner it was is also significant. With this topic, as well as the remainder of topics discussed in this chapter, the why questions are as important if not more important than the what questions.
In the first meeting of the seminar class in the regular classroom, not in the video classroom:

F1: Before you start planning how you will deliver your presentation, if you are scheduled to give one over the link, you should watch the video we have produced by the medical communication person...Basically, it talks about how to make slides, how to use your time, how to appear on the air.

S4: It is pretty good. I watched it sometime last quarter.

F2: There are some good ideas in there on how to prepare. She talks about how to work with the medium and the special conditions that brings with it.

*There was a strong push to have the students make sure they watched the tape. Both, from a presentation skills issue and a time utilization issue. Ironically, at the end of the quarter only two of the students and the two instructors of the seminar course reported they had watched the tape. The basic message of the videotape was to prepare in advance and plan your presentation carefully. Suggestions are given concerning slide production, being aware of the television medium's unique requirements including sizing of slides, attire, and the general notion of using time wisely. This seemed to mean, using all the time you have without having dead air space.*
In practice, the presentations in the seminar course followed closely in line with these basic suggestions. Each videoconferenced session met for exactly 60 minutes late in the afternoons during the latter part of the week. Based on review of the videotapes, during this 60 minutes, approximately 45 minutes was used as a conduit for one-way information delivery. Time would be taken at the beginning to introduce the topic and/or the speaker and roughly ten minutes would remain at the end of the session for questions. Little interaction ever took place during the structured presentation.

To illustrate this point, one outside faculty member was delivering a presentation on his research from Wooster. 35 minutes past the hour the fire alarm sounded in Kottman Hall. After about a one minute, the students in the Kottman Television Classroom began to file out. We all went downstairs and exited the building. As we exited, two of the students went ahead and left for the afternoon. The rest of us stood around talking.

ME: What did you think of his presentation?
S1: Well, you can tell that not everyone was very interested in what he was saying.
S9: At least he tried to get us to talk a little bit during the presentation. He showed a little bit of humor.

This time, as with many I tried to solicit opinions. Referring to the escapees, he, too, was not enthused about the presenter's style. This is where there are some pertinent points related to time usage. This person did encourage interaction, but it did not seem
S1: Yeah, but I doubt if he will even notice that we have left.

ME: He did seem a little oblivious to what we were doing down here when the alarm went off.

S9: There is only as little while left in the time. Oh, the alarm shut off, let's go back in.

This situation illustrated what was true with all seminar presentations. Namely, that all presenters were most concerned about getting all of their material out, not in making sure everyone understood what was being said. One presenter did ask four questions during the first thirty minutes of the presentation. But these were not discussion questions, but check questions to see if everyone was following. It was a philosophy of one-way delivery in education. This was in spite of the fact that in the evaluations and in the time that Columbus students met genuine.

This turned out to be a prophetic statement. Even though this student was speaking tongue-in-check, there was a strong sense that the person was oblivious to us in Columbus.

As we went back into the classroom the presenter made no comment, did not appear to look at the monitor, and continued to speak rapidly in order to get through all of his material before his time was up.

We left joking that maybe we should have left with the others at the alarm.
in the regular classroom, one of the most common complaints was with respect to whether the person was understandable.

During evaluation time in class:

F2: What did you think of last week’s presentation?

S1: I thought it was pretty good, what I could understand of it.

S5: He started out pretty well, but the further he got in his presentation, the more difficult it became to understand what exactly he was saying.

S9: This is one of the areas that several of the presenters have had trouble with. I think that one thing that we might do is to check out our presentations in advance in order to make sure that everyone is able to follow along. Maybe get a group of

This was the typical question for the follow-up class each week.

Sarcasm was also a typical form of response. It was accepted by all as a means of expressing an opinion. This comment started a long string of comments as it pertains to how a person should use their time in the presentations.

The class was very aware of the passage of time in the presentations. Often comments were prefaced with “At the beginning” or toward the end.”

This was my observation as well. A number of the presenters, both faculty and students would wind up losing their audience because they were dealing with technical issues to a mixed group who may or may not be familiar with their
us together and go over in advance what we are going to be saying.

S1: Well, I think for a particular audience his presentation probably would have been fine, but for a general or mixed audience it becomes more difficult.

F2: What did you think of (S9's) idea about getting together?
S1: Me? ...If I have my stuff together in advance that would be fine, but I have a tendency to be one of those that has to use every minute to get ready in the first place.

ME: I think that one of the things that would help is if people would just ask more questions. It is really difficult to gauge where people are at, but if we try and have some time not being aware of the language differences. This particular suggestion seemed like a good idea to me, but was not received with a great deal of enthusiasm.

This statement won agreement from the rest of the class, evidenced by heads nodding yes to the comment. This seemed to be not only a critique, but a concern of future presenters.

The instructor was good at steering discussions.

This was consistent with other interview times. Students who were presenting found little time to prepare. But in the prep, a primary concern was length of presentation.

It was at this point where I thought I could influence some of the issues pertaining to time and interaction. The overall response to the comment suggested to me that
for interaction, then we probably won't lose as many people.  

there was a good deal of agreement with this particular point. However, in the following courses, even when students asked for specific suggestions from me on how to improve their presentation, there were very few attempts as including question asking and answering as a planned time utilization issue.

Making sure all the minutes were used efficiently remained a dominant theme in the course, in spite of my suggesting otherwise both in class and to individuals who were students presenting in the seminar sessions. But this class paled in comparison to the philosophy of time utilization seen as essential to the running of the international students course.

As with the seminar course, the international students class met in intervals of sixty minutes. However, the international students class met three times a week, all of which were in the video classrooms. The instructor started as soon as he had at least a verbal OK from Columbus that we could hear him. After the routine, “Can you hear me?” question, the course would be underway. There were a few deviations off of this path that are discussed in later sections, but the time factor in the international students course was a sticky point for me because it differed fundamentally with the direction my own beliefs were headed in terms of how a course should function.
In a letter sent to the international students instructor:

**ME:** [M]ore time should be spent in interaction. I think that it would be helpful if students had a chance to interact more during the videoconferencing time.

**F3 (In a written response):** There is a large amount of information that we need to cover and the last time I taught this course, we did not get as much information out as we needed.

**This was one of the areas I felt really needed improvement.**

Especially in the international students course. The instructor would entertain questions if he was interrupted, but he would not solicit questions on his own.

The instructor seemed to be genuinely interested in my opinions concerning his course. This written response, as well as e-mail and personal visits all dealt with the opinions I had, but he seldom could see value in my positions. It was clear that in this instance, the major concern was in the delivery of information. The fact that the medium can be effectively utilized for interaction was a moot point.

Even in the face-to-face setting, the instructor felt that delivery of information was the primary concern of the instructor. Time could be spent outside of class for questions.
As an unexpected corollary to time utilization, there developed a certain culture, particularly in the seminar class, that yielded an expectation for visual preparation. Every presenter in the seminar had prepared either a set of slides or a set of overheads to be used as visual aids in the course. But the way each individual used these visual aids varied greatly.

One individual (student S7) prepared two sets of slides and had the extra set delivered to the other site via campus mail (an approach that was considered very considerate and helpful by all participants in a follow-up discussion in class). Two people (A3 and OF3) used overhead transparencies and then realized that the transparencies would not work well on the television. A technician finally had to come out and tell them to use a sheet of paper under the transparencies to provide enough contrast to broadcast over the link.

Some individuals used a variety of slides they had created in the course of their research, many of which were vertical slides that would be appealing in a standard slide show but did not fit onto the television screen. Some presenters did create all horizontal slides, but tried to include a large amount of text onto each slide. I felt like I was a subject in a study experimenting with visual aid usage. These experiments were in spite of the fact that very pointed instructions were given by the seminar course’s facilitators. A strong emphasis was placed on the visual aspects of the course intentionally by the instructors. They saw the medium as a visual medium and encouraged the students to think of it as such as well.
In the follow-up class after the first seminar presentation:

F1: Rule number one, never use vertical slides. The TV screen wacks off the top and bottom...either that, or the technicians zoom out so far that the image becomes difficult or impossible to see.

S6: He had a funny intro, but I didn’t know how that slide related to the discussion? A vertical slide of the University of Colorado football stadium..is that what it was?

F2: What did you think of the way the presenter dressed? (students chuckled, but no one responds)...I think we need to pay a little more attention to these kinds of things.

F1: Yeah, he was dressed like some kind of street person. I didn’t even realize he was the one presenting until he asked if I was the one in

Clearly, the instructor believed this to be very important in his mind. He was aware of the realities of the television medium and tried to encourage an appreciation of the limitations. But one of the results was an expectation to make a number of visuals and of sufficient quality they would meet most broadcast standards

This was typical of the way students reacted to presentations. Individual unusual items would jump out at them and elicit questions of “What was that?”

This attention to visual style was underscored during conversations in the class meeting outside of the television classroom.. People would comment on the dress or the quality of the slides.

The instructor borders on bigotry here as he talks about one of
charge. I was just trying to ignore him, but he kept following me.

S3 regularly asked, “Who is going to be on television this week?”

S9 was asked to fill in for a person who could not make the time slot. She refused based on the idea that she was not prepared to go onto TV and have everyone looking at her. S9: My slides don’t look very good and I don’t want to have everyone staring at me, yet. I’ll do the presentation in the classroom, but not on television.

Interestingly, time, dress and visual aids were all indicators of the adoption of a broadcast philosophy. Since the objective was to give as much information in the limited (valuable/expensive) time, visuals hasten the transfer rate and the appearance of the individual allows for more credibility and thus, leads to a more

guest faculty. This was one of the few occasions I was offended. This was a typical follow-up question. Instead of asking “Who was presenting?”, the question would be, Who is on television?” To me this indicated a visual and philosophical bias toward treating the medium differently than a regular classroom.

This was further evidence that the students somehow viewed their being on the link as being more important or more imposing than being in front of the class. A conception of visualization and time utilization followed with this type of rationale.
efficient transfer of information. This broadcast model of videoconferencing and the adoption to this one-way philosophy of education with the emphases on information delivery was pervasive in both classes.

My first impression of the system was there is a lot of money spent on the ability of students and instructors to interact, but very little interaction takes place. What seemed more important to many of the participants than actually interacting, was the perception that they could if they wanted.

Asked of individuals in face-to-face settings at different times:

ME: What are your views of interaction over the link?

S8: I think that being able to see and hear the person is an important function of the link. I think I would get real bored if I had to sit and watch a videotape or something like that?

S1: I had a course where we used videotapes and I hated it. You couldn’t ask questions, so you had to either remember them and ask the

Thankfully, the respondents understood the concept of interaction and associated it with the use of the technologies in the videoconferencing environment.

This person viewed the link as being central to her interest in the class.

This student, who responded in earlier interviews, continued to go back to earlier experiences of mediated courses and testified as
TAs who were present or wait until you had your recitation time to ask the questions. I like being able to ask questions if I need to.

IS2: If I have opportunity to ask, I will. But often, I will ask the professor in a phone call my question. I think that the video link is very good.

S10: I don't think I would take a course if I was not able to stop the professor right there and ask him a question.

IS5: I am not afraid to ask questions. I know that (F3) does not like it when I interrupt, but I feel that if I don't understand an issue, someone else probably doesn't either.

how bad it was. He enjoyed the allusion of control, but in practice, as with the earlier respondent, not likely to actually use the medium to ask questions.

This international student fell into this same pattern. He liked being able to ask, but in practice asked only one question the entire quarter in class time. However, he spent considerable time discussing certain issues with the instructor over the telephone.

This was a consistent finding among the participants. If people knew they would not be able to interact with the instructor in real time, they were not likely to enroll.

Indeed, this individual dominated what interaction there was in the international students class. Often receiving a short response or nonverbal cue from the instructor indicating his displeasure.
Knowing the opportunity to ask questions was available was enough to appease many participants. As the one student commented, she would never take a televised course if she did not have the ability to ask questions. However, out of the group of seventeen students from both courses, only one individual practiced asking questions on a regular (more than one per class period) level. One other female student would ask a question or two every other week, but most were content to sit and listen.

When asked how the students would improve how time was utilized in the courses, the reactions were varied. In face-to-face interviews at different times:

ME: So, how would you change how the time is used during class?

IS6: I would do more in changing the content to make it more current with the trends in \( x \). I had this course 3 years ago (not over the link-author) and little has been changed in the format. I think that more time needs to be spent developing the current issues. 

This person's comment was indicative of a consistent thread among the international students. She wanted to see a change in the content as it relates to the time spent one particular topic in the course. Reviewing old topics seemed a waste when newer topics were present.
This person said a phrase that came up regularly with this line of questioning—I don’t know.

Productive in this person’s mind equaled entertaining. Because of the confusion around the questions trying to get at time utilization, I made it more specific with this question. The net result was essentially the same. Students were not quick to recommend changes.

This was as far as the students would say in the use of time in the hour. This person suggested a “catch-up” time at the beginning. Time was universally seen as a commodity through which information ought to pass.

Consequently, time utilization, visual bias, and interaction function together because of the adoption of a specific philosophy regarding how time ought to be used in the educational process. Particularly, when the medium is seen as a time valued commodity such as television. Some of these issues will re-emerge in later sections. The next topic to be discussed is with respect to lighting technologies used in the videoconferencing system.
Lighting

Both of the classrooms used the same system of lighting since both were using the identical rooms and equipment. Both only used the standard overhead fluorescent fixtures to illuminate the subjects. The resulting image was usually a slightly greenish image with the eye sockets having a darker appearance than they would appear in person. However, part of the color shift was due to variance in the monitors or the lack of set-up time to adjust cameras, lights or monitors. Since each of the classrooms had three monitors operating each class period, it was easy to look from one to another and notice quite a range of display colors. Before and after a class mediated over the videoconferenced link, color bars were displayed.

The colorbars showed that the monitors were close in color reproduction but not exact. They also showed that bleed over effects and apparent clarity of the pictures were not quite the same, either. But these situations were not as peculiar as when overheads or slides were used in the presentations. Both sites would turn off the overhead lighting if a slide projector was turned on--even if the projector was at only one site. If only one location had a set of slides, then the camera would focus on the projector screen and an image would be sent to the other site. The image was slightly skewed since the cameras were mounted above and to the right of the projection screens. The result was less than desirable in my opinion. In the seminar course that relied on the slides, over half of the presentations resulted in not being able to see the presenter for a minimum of thirty minutes of the available sixty minutes.
As a follow-up question, focus groups were asked to respond to questions with respect to what they saw on the television monitors:

ME: How do you like what you see on the television screens?

S7: It's OK.

ME: What's OK?

S7: Well, you can see everything most of the time. If you can't see something it usually is because the person didn't pick a large enough font for their slides or they shot a picture from too far away with too small of a lens.

SI: I like it better when you can see the presenter more instead of just the slides. The other day we had the guy where you could see his arm as he pointed and even that little extra helped me. I felt like I was watching a human being, at least.

At times, the respondents were not very clear.

To this person, what was important was not the accuracy or the detail, but the wholeness of the images. They focused their attention on the fact that it was the presenter's responsibility to make sure everything is as good as possible.

This line of thought continued for several weeks in various discussions with students. Since the seminar class was prone to seeing just a slide with a disembodied voice narrating. This was true in the international students class, as will be shown in a later discussion. The key was seeing a human being.
ME: What do you think about how the lights are used in the class?
S4: I like it when they turn the lights out to show the slides. It gives us a feel that we are there with the group.

This person relays the lighting as a factor that relates to his being a part of the whole class, one of the few times this type of remark was made. The fact that the dimming of the lights did not increase viewability was not as relevant to this student as the fact of being a part of the group.

S10: I think it is OK when they turn the lights out, but I don’t care for the slides or the overheads being all crooked.

This student felt that the images on the screen were not pleasing aesthetically. Comments like this indicated that many students could not articulate well about certain particulars of the setting, but could describe what they liked and didn’t. Here, when the lights were turned off the student’s attention was drawn to the poor alignment of the camera and subjects being projected.
The seminar class’s tolerance for what they saw of the presenter was remarkable. Since this class relied so heavily on computer-generated and photographic slides, the lights were out frequently, but the focus groups were satisfied when the presenter was simply standing in front of portions of the slide to create what in practice was a partial silhouette. In other words, they liked being able to see a human being involved with the presentation even if they could not make out the human being’s features.

Both classes showed a high tolerance for what most technically oriented individuals would view as unacceptable image and light quality. But again, the practice was not as important to the participants as the perceptions. If the participants could get a sense of the person’s presentation style over the link, even if they could only see the persons arm pointing to the screen, they seemed content. However, when asked what they would do to improve these presentations, the students and instructors commented that a better system of graphic presentations was necessary. They would not address the specific issue of lighting, but they would address their desire to have both human presence and legible type and high color saturation in the graphics.

The rule of thumb for the operationalization of lighting for both groups seemed to be the simpler the better. This was in part due to the fact that the instructors or students were the ones responsible for making any adjustments to the existing lighting. The technicians who worked with the course did not have the time or the inclination to arrange or use the studio lights for the videoconferenced classes. Complaints from past groups about the heat of the lights and the intensity of the lighting for the presenters gave them a history that
precluded doing any more in the way of lighting. Because of the responsibilities
of producing other programs and spending time maintaining and moving
equipment to various locations in combination with the past history, the
technicians deemed lighting management for the classes as unnecessary.

Audio Management

As stated earlier, the microphones hanging from the ceiling of the video
rooms did not seem to be an ideal choice to me. Neither was the fact that the
microphones were not self-canceling and required that the technicians control the
levels of the microphones with a Yamaha audio mixing unit in the control room.
Frequently there was feedback over the speakers. Occasionally, there would be
foldback and the annoying echo effect. Even more frequently, for some reason
the speakers would have a tendency to pick up one of the local radio stations and
you could hear this when the sound levels were low in the outside corridors.

To me, the audio system in general was one of the most annoying aspects
of the videoconferencing room. However, my annoyance was entirely an isolated
opinion when compared to those of the students and the instructors. The
technicians were aware of the problems associated with the microphones and
would like to install PZM microphones to help eliminate some of the feedback
that is produced when microphones at both sites are open.

In face-to-face interviews at different
times:

ME: What do you think about the
quality of the sound coming into the
classroom?
S2: The sound is fine.
IS6: I don’t have any trouble hearing or asking questions.
S10: I am fairly impressed with how easy it is to hear each other over the link.
F3: I could hear the keys clacking down there, and wondered who it was that was following along with a computer.
ME: Yeah, I was the one, clacking.
ME: Would you change anything about the audio?
F1: I would like to eliminate some of the feedback we get occasionally. If the technicians aren’t listening closely, then we will get some strange sounds. But overall, it is more than adequate.
IS2: It would be easier if we had a better system for letting the professor know we have a question.
ME: How would you do this?
would provide a larger monitor or make it so that there was some kind of indicator light letting him know there was a question waiting. Ultimately, even questions related to audio came back to visual improvements and not to the audio itself.

These reactions surprised me. I had expected this to be one of the areas that would receive the highest level of attention, but in reality, out of all of the issues raised in this study, audio management was the least talked about design factor in a negative sense. As long as the individuals felt they could hear and talk, the fidelity, volume, and even interference created by feedback, foldback, or extraneous noise did not bother the participants. The videotapes revealed that some participants shivered when the feedback whine would come over the speakers and individuals would turn around to look at the technician to see if he was doing his job, but even this was less than expected.

This seeming lack of attention to the audio occurred in spite of the fact that each of the classes developed an opening ritual that began with, "Can you hear me down there in Columbus?" or "Can you hear us up there in Wooster?" The routine was set. People would use the first several seconds to establish that they were being perceived, and that would be the end of the attention to audio.

When I asked the person in charge of equipping the room, the audio system was his number one priority in changes. He has already selected a Shure videoconferencing audio system that allows talk-over and eliminates the present problem of feedback, foldback and manual adjustment of the audio levels. The specific requests have been submitted to the higher levels of the administration for
funding approval, but he has been told to wait. The television production crew unanimously selected the audio as the number one area for improvement, second on their collective list was new cameras for the Wooster facility. This would have been my first choice in improvements, too, before talking with the other participants in the interviews and the focus groups.

The fact that the more technically-oriented people selected the audio and the ones who were dealing with the system on a regular basis selected the video as the main area for improvement is an unexpected finding. The possible reasons for this will be discussed in more detail in the following chapter.

Staging

The department was equipped with the capability of creating limited sets and props. Neither of the two courses saw a need to prepare any type of special staging, other than the equipping of the rooms with the seats with arm desks. The focus on the staging becomes mostly a study in room arrangement, though some differences in background or aesthetics were noted by myself and several of the participants who had attended classes at both sites.

ME: What is your opinion of the classrooms?

FG1(S9): It kind of feels like walking into a closet. There is so much stuff, it is almost impossible to get around in there.

FG1(S5): Yeah, sometimes it is a little distracting.

The room is identified by the students, and eventually the instructor out of this focus group as being annoying, a little distracting, but in the end not a great deterrent to their performance.
ME: Does the room affect your performance or your attitudes concerning the course?

FG1(S1): It isn't the best situation in the world, but after awhile you kind of get used to it. However, it does make me think of the budget cuts, the fact that there isn't a place to put things. The same old story.

FG1(S8): The room is a little intimidating. You don't feel like you are going into a classroom, but that you have to be prepared to be on TV. Apparently, the participants in the videoconference understand the realities of limited resources. They become much more tolerant of the shortcomings because they can rationalize the fact that the setting is not being permitted to be ideal.

Again, the participants show a strong ability to adapt to the situation as best they can given the particulars about the situation.

The campus-wide budget cuts were a recurring theme, particularly as it related to the physical facilities of the videoconferencing rooms—at least in Columbus.

This student at a later time went to the degree that she did not present on the videoconferencing link when an opportunity arose to fill in for another student on the link,
but would present her research to the group when the link was not in operation.

The instructor echoes the thoughts of the students about the room in a more direct manner. This instructor has worked with the videoconferencing system since it started as a coordinator for a couple of classes. He had resolved that the reality was not necessarily the best situation, but this is the way it was.

In the two classes, an interesting progression of seating arrangements developed over the course of the quarter. In the seminar class, participants in Columbus at first scattered throughout the room and left the chairs in the row and column arrangement. However, over a period of just two weeks, individuals began migrating toward the back of the room. As each week passed, more and more people would sit as far back as possible. A running joke was begun by one of the students by saying, “This class must be some kind of church.” For the next several weeks people would come in and talk about aspects of praying or who the preacher was going to be today while finding a seat all the way in the rear.

Out of the eleven presentations delivered over the link in the seminar class, seven of them originated from Wooster. Since the speaker was not standing
in front of them, some of the people in Columbus began to arrange their chairs facing the rear monitor. This was in spite of the fact that two unused, dollied cameras were always sitting directly in the viewing path of the people seated in the rear. Additionally, the camera that was sending the image to Wooster typically was the front camera, so the image that was being sent of roughly half the class was the back of their heads. What struck me about this was that no one ever commented about the class having their "back" to the speaker and other participants in Wooster. Throughout the quarter, even when a class originated from Columbus, all of the participants in the Columbus site clustered at the rear.

In the international students class, the exact opposite scenario evolved. This course met in one hour intervals, three days a week instead of the seminar class which met in the video classroom only one day a week. In this class, the participants in both Columbus and Wooster started out scattered in their respective rooms, but by the middle of the third week, everyone in both of the classrooms was sitting in small clusters at the very front of the rooms.

One reason there was such different seating arrangements in the courses is because of the different teaching styles used in the classes. As previously discussed, the seminar course often turned out the lights since much of the material was delivered via slides and handouts. In the international students class, the instructor wrote the notes on an 8 1/2 by 11 inch notepad. The students were expected to copy down the notes verbatim to use as a study guide. Because of the small size of the monitors and the relatively small size of the handwriting, all of the students needed to move closer in an attempt to decipher the writing.
The most common complaint in the international students course was that the instructor "goes too fast...he makes it difficult to follow." This problem was compounded by the inability of some of the international students to read English at the comprehension level necessary for a highly technical, graduate level science course. What the different seating solutions show is how students adapted to the unique applications of the videoconferencing environment. Both courses dealt with technical information, but the approach to delivering that technical information was substantially different. One response was for the students to arrange themselves differently in the same classrooms with the same monitors, the same weak colors, and the same audio reproduction capabilities.

Shot Selection

All transmitted images were selected by the technician in charge of the sight. Two cameras were available to transmit images of people and one camera was always set up for use when viewing overheads and illustrations on the video cart. The control rooms and the television classrooms had the capacity to operate four cameras if they desired, but the technicians never saw the need to use more than these three. The two "people" cameras used at both sites were mounted near the monitors, one at the left front corner and one in the rear right corner. The only camera that was not mounted from the ceiling was the rear camera in Wooster. This camera was mounted on a tall dolly next to the monitor on the rolling television cart. This allowed the viewer, if they were looking at the correct monitor, to sense a directness in the viewing. Unfortunately, the participants did not always know which camera was operating. There were no obvious indicator lights and on one occasion the person doing the talking turned in circles, facing
the front camera and then the rear in an attempt to be looking into the correct camera.

For me, the most troubling aspect of having the cameras hanging from the ceiling was the resulting shot content. All shots from Wooster were at such an extreme downward viewing angle, that many times the only portion of the person that could be seen was the top of the head. If an instructor was teaching using an overhead or writing on a notepad using the video cart, then all that would be shown, sometimes for the entire class period, was the visual aid. Seldom were shots changed from one camera to another.

At first I believed this lack of changes in shot selection was a function of the disinterest or laziness of the technicians. I was corrected during interviews with several of the participants, instructors, students, and technicians.

A2: Most of the guys are acquainted with agriculture, but all of them have their principle training in either Broadcasting or Agricultural Communications--like me. I received my Bachelor's degree from the communication department here...Anyway, they like doing television production. This administrator was not trained in agriculture, but had learned about the discipline through his exposure as an agricultural communication specialist. Likewise, his employees were also primarily broadcasters. They are not there to learn about growing patterns or insecticides, but want to do TV.
F1: When the link first began the technicians were doing all kinds of changes with cameras. Zooming in here, moving over here. Unfortunately, they would not always focus on the right portion of a slide or diagram. After a while, it got to be so annoying we asked them to keep camera movements to a minimum.

T2: When I first started working here we tried to be a little more creative with the classes, but we started getting complaints and we said **** it. Our time is used up with so many things as it is, I figured that we could just set it up and leave it alone. I do pan with the folks if they are moving around a lot. But sometimes, if they won’t stand still, I will just set it at a wide angle and leave it. Let them wander all over.

The technicians were, in fact, treating the videoconferencing courses as they would a broadcast show. They would use all the cameras, change angles regularly, try to zoom in on portions of graphics the instructor was emphasizing. Unfortunately, the technicians were not able to understand always what was being discussed and would zoom in on the wrong area, or change cameras at inappropriate times, and this became distracting to the instructors and students. The faculty asked the television producers to make as few manipulations as possible. and they agreed. If they were going to get criticized for trying to make the classes more visually appealing, then they would keep it simple and leave it alone. In their minds, there was no reason to make things more difficult
What followed was a gradual decline in the involvement and the interests of the paid technicians. Since there was little to do, a recent undergraduate intern would frequently be assigned the task of monitoring the videoconferenced courses instead of one the paid staff. Editing would take place in the control rooms while the classes were being conducted and the basic idea of doing simultaneous work evolved. A conundrum for all involved developed.

The participants in the course desired a higher level of visual stimulation from the course through changes in cameras, angles, and focal lengths, but they did not want these to be done in such a way as to distract from the course. The technicians were engaged more highly when they had the opportunity to act as a director of a regular television program, but the knowledge gaps were so great, accurate direction was impossible. The end result is a situation where all involved have settled for a product which all believe to be less than desirable.

Turn-taking

For me, this was a troubling aspect of the videoconferencing experience. Whenever a person was trying to break into a conversation or ask a question, the interchange almost always seemed to require more effort than I felt should be necessary. Frequently, in the international students class, several students would attempt to draw attention to the instructor that someone was wanting to ask a question. The videotapes on numerous occasions illustrate people looking up to the monitor, raising their voices, and frequently giving up in their attempts to take a turn in the discussion.

In the seminar course, this same difficulty in turn-taking was also apparent. People would direct their speech to the microphones hanging from the
ceiling. Individuals would look back to the people in the control booths in an attempt to make sure they were being heard at the other end. The participants were put in a position to go out of their way to be noticed. Several commented that this difficulty in turn-taking might make the learning experience somehow worth less.

In face-to-face interviews at different times:

ME: How would you rate the interaction in the course as compared to a traditional class?

S7: It is easier to hide from the instructor and easier to tune out information that didn’t seem necessary.

OF2: Sometimes I can’t tell if a person is paying attention or not. The way the cameras are set, almost

_This student was quick to point out the ability to not be noticed when in the videoconferences. He felt safer in hiding from the instructor, more able to ignore what was going on if he was not interested._

_This was verified by several of the faculty members who taught over the link. One of the major_
everybody appears to be looking
down and I don't know who's
reading the Lantern or who is taking
notes.

S10: They schedule this class at the
absolute worse time of the day. Late,
end of the week, I need to take
something just to keep me alert.
ME: Does this have anything to do
with the technology?
S10: I think that we are trained to
ignore the television. I'll be studying
and just have the TV on for noise.
When I go into Kottman, I almost
think of it the same way as I do my
television at home.

concern for the faculty. Their ability
to gauge what was happening at the
other end was limited in their minds.
One instructor said that this was the
main reason he elected to
discontinue using the link for his own
courses. Because turn-taking was
difficult to manage from their
perspective, in that, they could not
encourage participation and
involvement from distant locations.

She matched my assessment
of the selection of times for the
seminar course. Meeting at the end
of the week late in the day seemed a
rather odd time. However, this was
when they could schedule with
OEBN. She goes on to describe how
the addition of a television to her
learning experience allows her to
drop out of the turn-taking sequence.
To her, the television is a medium of
background noise and not to be
Dropped student: One of the reasons that I dropped the class is because there is no way you can be treated fairly if you are in Columbus. I heard that (F3) spends a whole 'nother class period talking with the students up there about the class.

IS7: There may be some advantage to being in Wooster, but I don't think it is much. I have to call (F3) each week anyway because he is my advisor. He likes it if we call. We have a chance to talk about many things during the phone conversations.

S10: I heard that for this other class (international students class), you need to be in Wooster. I guess there is a professor who spends more time going over the material than he does with the students here.

This was a common complaint apparently. But it deals with the notions of turn-taking and interaction. This student felt like there was no way to be on an equal footing since the time was available only if you were present.

His opinions were not corroborated by students actually taking the course. This student was required to stay in regular contact with the instructor because she was his advisee. The other enrolled students were in agreement with here, even those not advisees.

But rumors die hard. This student, in a totally different department and field of study had heard the same comments. There was some type of grapevine that spread certain malicious talk about the way the link was used with the potential of discouraging some
I decided to approach the instructor of the international student course with the potential problem of unfair advantages for Wooster students.

ME: Rumors persist in Columbus that the students up here have an unfair advantage because you spend more time with the ones up here.

F3: That's a non-issue. You know yourself that I have made it clear that if anyone wants to talk in more detail, they can call or even come up if they wish. I will spend as much time as necessary. (IS1) comes up just about every Friday. I give him copies of the notes because he has trouble with the language. I won’t give copies to everyone. But sometimes I end up spending five or six hours with him. If they are really interested in learning, then they will find a way to get in touch with me.

The instructor had heard this issue before. He also had already come to a conclusion about the matter—it was a non-issue. He went on to defend his ability to be communicated with and gave evidences in his favor. In reviewing the tapes I found three specific instances where this instructor asked the students to make sure they communicated to him any questions they had. He made one remark that he preferred talking with them over the phone and, if necessary, they “could set up a weekly conference from enrolling in the course.”
I am also always available on e-mail. I check it probably three times a day. You sent me a note that way. Did you get my response?

ME: No, I don't think so [I later checked and no message had been received. He had followed the directions incorrectly to send e-mail from the Wooster campus to Columbus]

call to talk about the issues from class, as we did once before when I taught this course.” On two occasions he commented indirectly about his willingness to talk outside of the regular class time when he jokingly chided the group for not giving any feedback about the course. So, he did make requests for feedback. But when I visited the Wooster campus, as soon as the link went down, the students sitting in the room immediately had a number of questions. It seemed a rehearsed routine. Their turn-taking cue was the beep signaling the end of transmission. This, indeed, was an element that was missing from the resource list of the Columbus students. In addition, most of these students were also taking the lab that went along with this course whereas the Columbus students could not.
Varying levels of turn-taking had led to the development and perpetuation of rumors by at least one student that Columbus students were at a disadvantage when taking courses originating from Wooster. My visits and interviews, though they do not support any difference in evaluation of students by the instructor, did show that there were patterns of exchange that varied significantly from one site to the other.

The reason this seemed to be such a poor situation reflects back on one of the initial goals of the videoconferencing environment—to simulate as closely as possible the experience of a face-to-face interaction. In the typical interchanges in the classroom before and after the sessions, people would be conversing in their standard one-to-one volumes, they would look to make eye contact if they wanted to make a point, and some would simply interrupt their partners and carry on the conversation rather singly, if necessary. In the videoconferencing time, there was much less interaction and much greater effort put forth in the process of interaction.

The technicians, when somebody would ask a question, would try to zoom in on the individual who was asking the question so the instructor could know who was speaking, but the cameras were controlled remotely via a joystick and would often be so slow, that by the time the technician found the person asking the question or making a comment, they would be finished talking. Turn-taking was laborious and not very rewarding when accomplished. The combination of technical barriers and instructional strategies provided little incentive for participants to engage in a conversational approach to learning. This is a key element in the process of the videoconferencing experience.
Camera-monitor-subject relationships

Camera-monitor-subject relationships are exactly what the name implies. The location of the camera, the focal length of the lens of the camera, the size of the monitor, the distance of the viewing subjects from the monitor all work together to form a particular experience for the viewer. Though this term was not used the respondents, this area was one that received a good deal of attention from the respondents. They were very concerned with how this relationship worked in their own situations.

In the focus group 1:

ME: What would you do to improve the videoconferencing class?

S9: We need to have one of those big screen TVs.

S6: A big monitor would be helpful.

S10: If it was a larger screen, it should be set at a level we didn’t have to crane our necks to see.

F2: One of the extension agents brought in one of those TV projectors for one of the AgSat programs, and that thing made all the difference in the world. Usually, I don’t think much about the size of the TV, but when it was there, wow.

In the focus groups, the unanimous single correction to the setting would be the installation of a larger monitor. One, to compensate for the lack of ability to read fine detail. Two, to create an experience that was attention getting and involved the participants.

One of the instructors even supported the notion of the larger monitor with his own experiences with larger monitors in Wooster.

Virtually everyone commented on this aspect of the videoconferencing experience. Such consistency was
participants. Apparently each of the instructors and students had been exposed to larger screens and found them to be more effective in producing the desired outcome.

IS2: A big screen would help us see the handwriting better...even if we still couldn't read it. Though he was joking, this student still saw the big screen as at least having the potential of improving the system.

The seating arrangement already discussed contributes significantly to this camera-monitor-subject relationship and the international class illustrated that with the small monitors, they were compelled to get as close as they could--even if the viewing angle was uncomfortable. The seminar class also illustrated this when all would sit in the rear, they still would turn their chairs around to see the rear monitor. There was an apparent desire to gain as much detail as they could from the monitors.

No one commented that having larger monitors would help them understand the people better, but comments were made in class and during the interviews that larger monitors would make it easier to read the nonverbal expressions. “I would like to be able to see a person’s eyes when they are
talking.” “The nice thing about larger monitors is that it helps you see whether the person is smiling, frowning, tense...”

As seen in an earlier transcript, one of the focus groups also dealt indirectly when they suggested that the rooms be arranged so that everyone could see the monitors clearly and be roughly the same distance away. They would like to see amphitheater design for this type of mediated course. Given the consistency among respondents’ comments and the fact that even in the seats closest to the monitors, participants were still classified as being in one of Bretz’s (1983) distant perceived proxemic categories, this is one area that is in need of improvement.

**Instructional Strategies**

This aspect of the videoconferencing courses was one of the most peculiar areas to assess. Having been engaged in courses for six years where most, if not all, involved a large amount of discussion, I found the limited amount of discussion in both courses distressing. There was a fundamental difference between my own personal experiences in education and what the students in the college of Agriculture were experiencing. This was particularly true in the international students course.

Comments made during class:

F3: Make note of any questions you might have and if we run out of time during the link, you can phone, fax or e-mail and I can answer them later. We will be using virtually all

This instructor had adopted a very one-way, top-down model of learning. He was to be the information deliverer and the
the time we have available in here for lecture.

students were the receptacles into whom he would pour information.

Over the course of the quarter, students at both sites seemed to develop a greater willingness to

Last two days of the course:

F3: Since we are running so close, I would prefer that there not be any questions unless it is absolutely necessary.

A student came into the class period a little late (IS6) and missed the plea.

IS6: I didn’t understand what you meant by $x$?

F3: We don’t really have time for that now, the others in the class can let you know about the time crunch.

To me, this was indicative of the overly top-down philosophy adopted for this course. I was glad when a person came in to challenge the philosophy.

When she did ask her first question the other students looked around at each other and at her with a look of disbelief and with tiny smirks on their faces. The class let out a sort of collective laugh as a sign of relief that the encounter did not explode into a major problem.
Further evidence of this one-way delivery philosophy was the style of lecturing this particular instructor developed for this course. In all of the class meetings, there was one dominant method of information delivery. As the instructor would talk, he would write down in short phrases what he said on an 8 1/2 by 11 inch yellow lined notepad. To add injury to what I considered an insult, he would write with a ball-point pen which was difficult for the cameras to pick up at times.

In my discussions with the students who remained in this class, this approach was not thought to be much of a problem. The instructor viewed the system as a good way to maintain his pacing in the course.

In face-to-face interviews at different times:
ME: What is your opinion of the teaching styles for the videoconferenced course?

IS7: As I said before, I think I would change the content of the course somewhat, but overall I like the course.

IS2: I think the course it pretty good. I think (F3) writes too fast for me. So, if he slow down, then it would be OK.

This student was stuck on the concept of course content, but showed a remarkable tolerance for the teaching style.

This student, as did all of the students in the international students class were consistently positive about the experience. At least
ME: How would you teach this course if you were assigned to be the instructor?

IS7: There is not much I would do differently. Maybe I would try to give some more handouts with the information already written down, but I actually like copying down the notes as he is writing. The only problem is that some of the other students' English is not good enough to follow along and write down the correct spellings and everything. Sometimes you have to remind him to write so we can see, but even then, they still cannot understand everything. But the new question would not deter the international students from being very positive of the instructor and the basic approach to the course. They do not rave about the instructor, but neither do they really criticize him. They do make comments that suggest they are annoyed with his occasional writing beyond the range of the camera and not writing slow or fast enough, but I saw these as minor points in a larger frame. The philosophy that dictates the recording of word for word lecturing was beyond my understanding. However, it was acceptable to those who remained in the course.
IS6: If I were teaching I would provide more time for questions and answers. I think there are a number of issues that cannot be solved just by listing them out.

Dropping student 1: I could read a list of terms at home.

T2: How can anyone be expected to stay interested in this course? We have suggested that he use a different style, maybe even just writing on the blackboard, but nothing has changed.

This seemed a consistent response to the most talkative person in both courses. But I have to agree with her that simply listing terms on a piece of paper seems a rather modest from of coming to know about a particular subject.

Opinions from outside the circle of international students were not as favorable. This student who dropped the class, saw the list as ridiculous. He did not see this strategy as being educational.

This technician saw the international students class as absurd. His tone of voice in these comments suggested that he was in disbelief that anyone could remain attentive in the course. He reported having asked the instructor to adopt a different strategy in the past, but to no avail. One field note of mine suggested I build up a level of tolerance..
The seminar class, though somewhat different in style, still followed in the tradition of information delivery as the main objective of education. As mentioned earlier, each one hour videoconferencing session followed a pattern of the presenter being introduced in the first two to three minutes, the speaker would talk without interaction for the next 40 to 45 minutes; finally, the last ten to fifteen minutes were reserved for questions.

Both courses were caught in a cycle that denied some of the power of the videoconferencing capabilities. Some of the participants, both students and instructors were aware of the greater capabilities of the system, but elected to stay with this approach to learning since they were familiar with the linear information delivery style. This is probably as anticipated. Within institutionalized education, the array of learning and teaching philosophies and styles is mind boggling. In certain disciplines, a particular style is promoted and developed as the more acceptable style. In these departments of Agriculture, these instructional styles were consistent with what was practiced in many of the classrooms. However, there were a number of elements of these two videoconferencing courses that I failed to anticipate or did not think would be a concern. The following is a discussion of those unexpected findings.

Affect: Fear/Novelty

Affect, as defined in the chapter on methodology and methods, is the composite of those feelings for or against something or someone. I knew these to be a component of the literature, some of which are outlined in the first chapter, but failed to think that with a system that had been in operation for six years
would be much of a concern. The following comments and observations proved otherwise.

My first day in the television classroom with the international students course, we are standing outside in the hall waiting for the door to be unlocked:

IS1: We are going to be meeting in this room, the one with the TVs and all...I’m getting scared about this whole thing.  

T2: When you have a question it is probably a good idea to raise your hand so that I can see who is asking the question... Don’t panic if the video or the sound goes out, as with any technology, there are things that go wrong, but we can usually get things back up in a short amount of time.

This student had built up serious reservations about taking a mediated course. His feelings were not to be relieved, at least in the first day.

Ironically, no one ever raised their hand to ask a question in either class the entire quarter. However, this speech was not given to the seminar class. But even so, the audio was perceived by the students to be a sufficient cue for the operations of both courses. His comments pertaining to the potential failure of the equipment did not seem to
T2: Good luck with this class. I have seen this one too many times.

Face-to-face at a later time:

ME: What did you mean when you said you had seen this course too many times.

T2: I have done this for a while now, and this instructor has always taught this xx class. I have told him and told him to not write off of the screen and he always does. Last time he taught this class there was almost an uprising.

His past history with the course had been negative. The instructor did not listen to his suggestions and he alludes to the fact that the students did not like the instructor much, either. His feelings were very strong and were displayed.
through his intonation and his facial expressions of strong nausea and vomiting that accompanied his words.

My anxiety may have been due to the fact that this was going to be the data collection for my dissertation project, but I couldn’t help but feel that I was somehow distant from the person who could throw me out of the room if he desired—the instructor. I wondered, “If I was feeling anxious about this class and was very familiar with the different aspects of videoconferencing, what were the others feeling who had not been enrolled in a videoconferenced course in the past?” The responses to this question fell on two sides of the same coin.

As with the very first student I encountered in the hall who was apprehensive about being in a class where he would be on television, I found a number of students in both classes who were genuinely afraid of having to face a camera. In follow-up questioning, they did not seem to be afraid of the technology; rather, they seemed afraid of having to give control of where their image was going.

Face-to-face interview:

ME: What don’t you like about the videoconferencing system? Through asking what they didn’t like, some of the deep-seated apprehensions were revealed that didn’t come out in other questions.
S10: I hated having to get ready for going on television...I’m afraid someone will see me dressed as a slobby student.

S4: It bugs me sometimes that I don’t know who exactly is at the other end of the thing.

This was consistent throughout many of the comments. Students did not like losing control over who could or could not see them on the television. Even though they don’t have any real control who can see them when they are walking around campus., control of the transmitted image was important. The television brought an added awareness to their own physical appearance that meeting people face-to-face didn’t necessarily bring.

Issues related to privacy and trust were also consistent among respondents and with other videoconferencing participants, but was not mentioned frequently as a concern. Few were worried someone might see them that should not be allowed to see them. The issue for this student was one of knowing the audience, not losing control over the transmitted image.
Related to the fear, but with a different background was that several of the participants (all of whom were in their forties) had been through what they considered very negative experiences with other instructional technologies in the past. One student, mentioned in an earlier transcript, was very negatively disposed toward instructional television. He had taken an undergraduate biology course offered in the sixties at Ohio State University that implemented a one-way video class. An instructor lectured, the students took notes, and if there were any questions, they had to ask the teaching assistants at the recitation section meeting. He was concerned that the videoconferencing would be as frustrating as the instructional television had been for him.

However, after being involved with the course for a short time, his anxiety changed to a sort of youthful zeal for the process. He went from being anxious about the course to being enthusiastic about the technology, if not the course itself. He became intrigued with the system. His case (he happened to be in three consecutive sections of the seminar course) evolved from apprehension to intrigue. Part of his development may be attributable to the fact that he and I spent a considerable amount of time talking about the technology and the various aspects of the technology as it related to learning.

However, there were as many that did not express fear about their first encounters with the videoconferencing environment, but a genuine enthusiasm related to the novelty of the experience from the very outset. This dualism of attitudes toward the system provided a good ground from which to inquire.
Face-to-face interviews:

ME: What was your reaction when you first entered into the classroom or found out it was going to be using the videoconferencing link?

S3: When I first went into the classroom, I thought, this is going to be really neat. I think a lot of people would find the videoconferencing interesting.

S5: "At first, I wasn't sure what it was going to be like, but I was very interested in seeing how the technology worked.

ME: So, what do you think after being involved with the system for some time?

S2: It's OK.

IS2: It's OK.

In contrast to those who earlier expressed a kind of fear or anxiety, these individuals represented about half of the students who saw the class as being potentially very interesting because of the media used in the class. These feelings were expressed as being from moderate to strong.

Everyone didn’t respond this way, but these two together show a acceptance and somewhat neutral attitude with respect to videoconferencing technologies. Tolerance of the medium was a consistent theme of the participants.
ME: Would you place your interest as being higher, lower, or the same as when you begun?
S9: Lower.
IS2: Lower.
S4: Lower.

F2: When I first was assigned teaching a course using the link, I was really intrigued with the concept, but after I had been doing it for some time, I elected to drive to Columbus for future classes.
ME: Why?
F2: There is something missing when you teach this way. The link works well for short term meetings and such, but for regular classes, I feel like I need to be in the room with the students.

After working with some students whose fear subsided and became more interested in the technology, others displayed what I would call a reverse curve. Mapping the class, it would be as if the group started out at two polar extremes and converged on a median point.

This was telling, I thought of how the link was perceived by faculty. Originally seen as a good thing, the link eventually ended up being viewed as deficient for accomplishing the task of teaching by this instructor. His was an opinion echoed by other outside faculty members and his co-instructor, as well. The seminar course was a partial exception to their own rule of what works best, in that, the one instructor from Wooster would drive down on the off-link
ME: What was missing from the videoconferencing experience that you could only get in person?

F2: I am not sure, but there is something about being in the room with other people that creates a more personal feeling.

Everyone saw the videoconferencing link as missing something, so as the course went on, I felt the need to ask them what was missing from here that they could get in person.

The added benefits of being in person was another unanticipated finding in this study. I had expected that some people might see the link as being too impersonal, a result of the label of technology as being too impersonal. But all of the participants, even the technically-oriented, were of one mind on this topic as well. This is the topic of the following section entitled presence.

Presence

ME: If you had a choice between (teaching/taking) a course that was taught face-to-face and another course with the same content but was days, but would remain in Wooster for the on-link times.

Having not anticipated the notion of presence, I had anticipated that individuals would have a choice between one form of delivery and
delivered through a videoconferencing medium, which would you choose?

FG1 (Most replying in unison):
traditional/face-to-face/regular class.

FG2 (Several replying at once): one student clearly stating, “I would take the face-to-face class.”

ME: Why?

IS7: You just learn better when you are in the room with the person.

ME: How so?

IS7: In a regular class, the professor can see if you are following him or if another. What I had not anticipated is if given a choice, everyone would choose the same. These individuals were adamant about this point. If given a choice, all would select the face-to-face encounter. This was consistent among interviews, individuals, times, places, and ages. Even the technicians who worked every day with the audio and video technologies responded in kind.

All respondents had difficulty in thinking of a response they felt was satisfactory for the question. Many felt this was a good question for them to ponder on their own. Was there something magical about being next to a human being? This person alluded to this as a possibility.
you are have a question by the
e expression on your face.
ME: So, is the fact that you “learn
more a nonverbal element of the
classroom setting?
IS7: Maybe that is part of it?

OF2: One of the reasons that I like
to drive down to Columbus instead
of teach over the link is that it is
easier for me to interact with the
students. I can tell whether they are
understanding the material or
whether they are lost.
ME: How?
Well, mostly by the expressions on
their faces, I suppose. Oh, it is also
easier for me to spot people who are
reading their Lanterns, or studying
for another class when I am here in
person, too, but I just like being with
the students. There is a certain
presence there.”

Assigning presence as a
function of some nebulous nonverbal
construct was fairly common as a
response among the participants.
However, after some time and
discussion in focus groups and the
like, most were not content to keep it
only as nonverbal.

This instructor, one who
worked as a consultant for the two
seminar teachers and was listed as a
resource person in Wooster for those
who wanted to become more
accustomed to the link.

Though this instructor was
regarded as one of the most
competent in using the link, he too
had decided to drive to Columbus for
classes whenever physically possible.
The reason, according to this
account, is because he did not
experience the same presence on the
link as when in person.
ME: What else contributes to videoconferencing as being somehow less effective than being face-to-face?

S1: There is just a presence when you are in the room with a person.

S10: I am a person who likes to be with other people, I enjoy their presence.

S8: I don’t know how you would describe the difference, I guess you could say that when the person is in the room with you there is a presence about that person.

I attempt to fish out what the elements of this presence are since the respondents are having such a difficult time with the particulars.

The respondents, when trying to supply what is different settle on a term instead, to describe the difference. There is a certain inability among the participants to cue in on any single aspects of the difference, but they know that this something they have termed presence is there when you are in a face-to-face meeting, but is not there in a videoconferenced session.

As mentioned in the narrative on camera-monitor-subject relationships, the participants felt as if something was wrong if they could not “read” the other group’s nonverbal cues. This attention to detail seemed to be at a threshold just above awareness and intent. The respondents knew they were wanting to see and hear something from the other end, but it was so difficult to put into words, everyone stumbled over the questions. But as the responses illustrate above, the one term came out in many of the interviews was the actual term “presence.”
Person after person kept coming back to this notion of presence; so much so, that I felt as if I had missed a major portion of the literature on videoconferencing when I was doing my preparation for this study. Not only did the respondents suggest that there was something different about being in the room with the person, several also suggested that there were specific effects attributable to this presence.

One instructor commented that he had a significant difference in instructor evaluation scores depending on whether he drove to Columbus frequently or whether he utilized more of the videoconferencing opportunities. In his opinion, the lower scores were the result of students feeling as if they were not getting “their money’s worth.” According to him, the reason they did not feel they were getting their money’s worth was because he was perceived as being difficult to contact, uninterested in their individual welfare, and generally, not as valuable as the instructor who was on campus. As a result, he felt that just by physically showing up into the room raised his evaluations.

Ironically, another instructor who used the videoconferencing link in addition to a satellite link to teach a graduate level teacher training course to six different sites found that his evaluation scores were lowest from the students present with him in the studio. This baffled him for a time, so in his own efforts he asked some of the students who had taken the course in the Columbus studio why this had happened. According to this instructor, the students in the studio felt as if the instructor was attending more to the students at the remote locations than to them. They told him he looked at the camera and not at them (no eye contact). They said that most questions asked in the course were asked of students at the
remote sites and not in Columbus. Finally, they suggested that the set, cameras, cue cards with the names of all the students (over one hundred), and the high-intensity lighting used (since this was broadcast over satellite, higher production standards were established) made them feel outside of the instructional experience. These students apparently perceived themselves as a viewing audience and not as participants or cohorts with the remote students.

Participants expressed a desire to have a choice in what drew their attention. They felt that the camera was limiting, or in the case of the satellite course, the set functioned as a barricade to the presence of the instructor and to their personal selection of information. Distracting elements of the rooms and the technologies were thought to be deterrents to experiencing this presence.

Presence, either in the positive or negative, was displayed as a powerful, yet nebulous construct for the participants. Participants from many countries and cultures attributed greater ability to sharing learning when the person was “with you.” Describing this “withness” and the aspects of what constitutes presence is difficult, but seems related to camera-monitor-subject relationships, detail detection, perceptual decision making, and the overall directness of contact and communication with another party.

In face-to-face interviews:

ME: What specifically do you think helps create this presence you mention?

It was difficult to settle with such a nebulous and elusive term.

Toward the end of the quarter I tried to get individuals to express what they were meaning to me when
S9: I think some of it may be in the ability to see the person's eyes and face. There is so much information that is relayed about the person that comes through that way, I can't help but think this is part of it.

S1: I think knowing that the person is right there, able to look right at you or able to pat you on the back if they need your attention has something to with it. I just know that when I am in the room with the professor and not interested in participating, all he or she has to do is give me some attention and my ears perk up.

IS2: I am not sure I understand, but I think that this presence you ask about has to do with how directly the professor looks at me. Whether he knows who I am. How long we have been working.

they would bring up the term.

One potential explanation that relates to well to the experiences of the instructors was with respect to eye contact. Having direct eye contact and the ability to see detail around the person was consistent.

This person also mentions eye contact, but also brings up a theme not mentioned as often—the ability to touch or sense the nearness of a person. This student relates nearness or proximity to motivation in the classroom, albeit a potentially negative type of motivation in his personal example. However, he brings up an additional dimension.

The international students probably had the most difficulty in answering the question and felt wanting as an interviewer not being able to translate certain terms into their native language. This respondent, however, coped well
with my inability to speak his native language and suggested that there may be certain dimensions of presence related to the degree of acquaintance and time spent together in the past. I found this to be an insightful possibility I had not previously considered.

Presence, though it was a difficult concept for the participants to put into words, was a dominant aspect of this study. More than any other construct, this one stood out in my mind as being the most overlooked as it relates to mediated interactions. Short, Williams, and Christie (1976) were right in assigning this a central role for the development of theory of telecommunications.

The Changes

My philosophical orientation going into this project was to somehow allow the videoconferencing system and the courses to be improved according to the input of the participants. Actualizing his predisposition proved to be more challenging than I expected. Those who were potential candidates for implementing real change in the videoconferencing process were verbally open to suggestions, but in practice quite resistant.

A prominent example of this verbal openness and real-life resistance was one of the instructors. The instructor of the international students class used the opening minutes of several class sessions to ask for suggestions on improving the
course. I felt obliged to respond with suggestions. Out of six specific suggestions on making the course more appropriate to the technology and more appealing to the students, the instructor responded with reasons why five of them should not be implemented. This is not to say that the instructor was closed-minded about making improvements. My sense was he truly wanted to help his courses improve, but he developed reasons to justify not implementing all but one of the suggestions I provided.

An outline of what was sent to the instructor is presented here:

I do not know enough about the area to say anything about the content, but in delivery I would have these suggestions:

1) Consider using the chalkboard instead of the notebook paper. Reason: Nonverbal elements are eliminated and the only thing we see is your writing. The technical guys here said the cameras could pick up the writing without any problem. This would make it seem more like a regular course.

2) Allow the students more time to ask questions. In Columbus, it seems that several have questions at different points, throughout, but there is usually little time to inquire. Frequently, the link expires before any time is allowed.

3) Possibly develop either slides, overheads, or in-class handouts where there is simply a listing of x, etc. Sometimes, the pronunciation you say does not seem to always match the spelling. Of course, these can be checked with the reference text, but it would eliminate confusion.

4) Please repeat questions that are asked from Wooster. We cannot hear what they say. This would help us feel more a part.

5) Illustrate your points with appropriate devices. Color slides, examples of the micrography, z, etc. would help maintain interest visually. When illustrating uses of y's, bringing in a working unit would help.

6) In general, spend more time in interaction and explanation.

In addition to mailing a list of suggestions, we also talked on occasion about these over e-mail and in person. His reaction was always open, but there was usually a reason for not employing certain suggestions. For example,
suggestion one listed in the outline was from one of the technicians. I expressed to the instructor that looking at a yellow notebook pad for almost sixty minutes was not visually stimulating and it eliminates the ability of the students to read his gestures and expressions. I recommended that he use the chalkboard that is mounted directly behind the cart. I told him this would more closely resemble a traditional classroom (and I also believed that it would force him to write larger, possibly making it easier for the students to read). His response was that he used the writing on the notebook to pace himself. He figures students ought to be able to write as rapidly as he does. Therefore, by writing the notes out he knows that has covered as much as he can without going too fast. He also kept the notepad because he uses this later to write test questions since he has a record of exactly what he said in the lectures. This was indicative of his teacher-centered approach to the learning process.

Other suggestions that were designed to offset the need for the notepad and the boring visual presentation was to provide handouts of the lists in advance and allow the students to ask questions and comments based on the handouts during the videoconferencing time. His response was that the time it takes to prepare the lecture notes and then distribute them would be longer than the time currently being consumed. Also, it was his desire that students would go home and think about the lectures. He felt that some of the best opportunities for learning the material do not take place in the classroom, but in the minds of the students when they are studying or contemplating the implications of the material provided in class. He did not seem to accept the view that learning was an
interactive process, but more like an intra-active process—something that took place in the mind of the learner when home alone contemplating the material.

The instructor did make a concerted effort to repeat questions that were stated in Wooster after my list of suggestions. The instructor was not aware that comments made in his room could not be heard in the Columbus site at most times. On occasion, he would forget to repeat the question, but in the process of answering it remember and then re-state it for the members of the class in Wooster. This in some way helped me feel like I contributed at least in part to improving the operation of the course.

There was also an attempt to address my issue of not being able to see the instructor during the videoconference, but it was in an alternate mode than I had envisioned. Instead of writing on the board, the idea shot down earlier, the instructor, in conjunction with a Master’s student in education who was doing an internship at the Wooster site, came up with the idea of overlaying a shot of the instructor over the shot of the notebook. This began about the middle of the quarter, the class period preceding the mid-term exam.

The initial reaction of the students in the class was a sort of puzzlement. At first, there were some significant problems accompanying this ‘solution’. The insert would often block out the writing the instructor was doing, since he was not paying attention to his own review monitor. The intern’s initial solution to this problem was to move the insert to different corners of the screen as the instructor wrote. I found this distracting and the students appeared to find this amusing. Eventually, the instructor became more aware of this image overlay and tried to avoid writing outside of the viewing area.
Another solution that this same duo devised in response to the lack of variety in visual interest and in audio pitch and tone (I had suggested that the instructor might vary more of his presentational speaking voice), was to play Shostakovich over the network. The idea was to allow this to function as a sound bed that would help students maintain interest in the course. This was the first time I had ever seen this idea tried in a classroom setting. My reaction was essentially one of disbelief.

Having never heard of this approach, I went to the library and found a University of Florida survey study that said elementary teachers had found that using classical music had helped calm their students. This study also reported that more and more teachers were adopting this method.

I could more easily reconcile using the classical music as a calming device as opposed to an interest device, particularly given the fact that all of the students in the course had been raised outside of a culture that would even find most classical music appealing. One student described, “I have gotten used to the noise. In my country, that is what we would call this type of music.” I asked the students if they found the music distracting, they all said it was a little distracting at first, but that after time, they became acclimated to the sounds and were able to block them out.

This adaptation to undesirable elements struck me as very tolerant and somewhat remarkable. Again, toleration and adaptation of the students to the teaching styles and the media employed is a recurring theme for this project. The professor had adopted a teaching method that the students found to be distracting,
but managed to adjust their perceptual skills to overcome any difficulties the sounds presented.

One possible explanation for students to be willing to adapt to less than ideal learning conditions, be they instructors, facilities, or television monitors, may be grounded in their experiences of the life-world. Many of the participants had left jobs or had been sent to the United States by their home countries to become better equipped. Many of the participants had seen the less than desirable aspects of the work-a-day world and they could make the jump to the realm of education. Unfortunately, this adaptation may also contribute to a resistance by some to interfere with the regular activities of a pre-existing entity--namely, an instructor or a course.

When I told the professor some of the reactions of the students pertaining to the music, he was a little baffled as to why they didn’t tell him they didn’t care for the experiment. Regardless, the attempt of the professor to institute some changes based on my suggestions was encouraging, but the fact that most suggestions were rationalized away or were altered to such a degree as to prove counterproductive was illuminating.

Similar experiences were associated with the seminar class and with the technicians working with both courses, but not to the degree they were illustrated in the international students class. Change in the technicians’ minds were almost always tied to dollars. Aspects of the videoconferencing could not be altered unless there were funds to provide for new equipment. The sound, the poor cameras at Wooster, the limited amount of space available for these classes and production work conspired to make change seem cost inefficient.
For example, the facilities own a reasonable quality video projection unit, but space limitations and less than perfect image quality made the technicians feel this was pointless to incorporate into their routine. The use of the projection unit would require set-up and take-down many times during the week and would also interfere with any type of slides a presenter would like to use in the lecture. The person would need to choose either the large screen monitor or the slides. If it came down to offering a real choice, the instructors would select the slides. The response—if we had another room and more money for a better monitor, this would be a great idea.

The presenters in the seminar class were offered fewer suggestions since there was such a diversity, but individuals would ask for suggestions from me in their preparation process. They asked about their speaking voices, where they should use their visuals, and other skill questions related to the presentation. However, all of this was conducted without the use of any kind of camera or media system before they presented. Typically, suggestions were used as a guideline, but personalities took command of their presentation styles and strategies after only a few minutes into the presentation.

What I found personally, however, was that the short amount of question time at the end of the seminar as well as the frequent visual aids left me with a much more positive feeling about the experience than with the international students course. I asked each of the classes if they would recommend this course to their friends in the departments. The seminar class said yes immediately. The international students class qualified their yes with comments like, "If there is
more material added on x, then I would.” Or, “if they are really wanting to learn about x, then they would need to have this class.”

Change is a long and laborious process. If I had been involved with these courses for two years, I am not certain how much real change would be reflected. Unfortunately, while conducting the research, I did not have all the information I am reporting now. My hope is that the executive summary (Appendix D) I deliver to the professors, administrators, and staff people who work with the courses as well as the completed dissertation being available to them for review will help spur on more changes in the future for the instructional videoconferencing system.

As far as the students are concerned, I do not expect any more contact with them about this process, except with one or two who became close friends in part because of this project. My hope is that they learned from my involvement with them about how to view a mediated environment and to ask critical questions as they pertain to these types of environments. The conjunction of students, faculty, administrators and staff all seeking to make improvements makes for a bright future if the energy and initiative are present in great enough quantities.
Chapter IV

Discussion: What does it all mean?

There are two levels of discussion that follow from the above findings. First, what are the necessary improvements that should work for the videoconferencing system utilized by the College of Agriculture? Second, and perhaps more compellingly, what are the theoretical implications that can be drawn from this specific situation?

Practical Suggestions for Improvement

Resource-related improvements

The difficulty with making suggestions for improvement based on resources available is that one improvement may be tied or dependent upon another also being implemented. If the College of Agriculture had enlisted the help of telecommunications and education consultants at the outset, there is a possibility that these suggestions would not be necessary today. But the fact remains, there are a lot of improvements the College can make if they can afford the expense. The following suggestions are listed in order of priority as they emerged from the participants and my involvement with the videoconferencing system.

Larger monitors

Clearly, from the comments made by the diversity of participants, the major concern of these groups related to the visual components of the courses. Students wanted more time to view certain graphic details, they desired a more

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attention grabbing atmosphere. The instructors were not as much in agreement
with the attention grabbing part as they were interested in seeing more detail. All
the instructors and students felt the first improvement to be made to the
videoconferencing classrooms is to include a single, large screen monitor as the
only viewing medium.

After some thought and reading, I am in agreement with the participants’
suggestions. The consensus of their opinion, and the work by Bretz (1983), some
of my own work (Ellis, 1992b), and the recent practical articles by authors such as
Lund and Warren (1992) suggest that a large screen is an appropriate device as
long as the screen is not too large and the seats are not too close to the viewing
screen.

Room changes

Secondly, the participants’ felt that the arrangement of the room, at least in
Columbus, needed to be such that it did not distract from the course. They desired
more space for the students and instructors that would accommodate interaction
among participants and better viewing angles to the monitor. This implies that
other facilities be located that could operate as a video classroom and only as a
classroom. The sharing of duties for Kottman 244 as a production/classroom does
not make for a smooth transition. The participants on all sides have found ways
to work around the inconvenience, but in order to more closely align the
participants needs and desires for videoconferencing, another room is necessary.
Again, this is consistent with Acker and McCain’s (1992) suggestions dealing
with the conceptual areas of room and facility design. Values are imbued and
embedded in a particular setting. Implicitly, the double duty of this television
classroom in Columbus lends a feeling of cheapness to the process, possibly what some students are reporting as not getting their money's worth.

Audio upgrade

This area is the most troubling issue with respect to the recommendations of the project. Even though most participants' comments indicated that they found the sound system well within their limits of toleration, the added effort displayed in turn-taking, the opening routines of reassurances, and the practice of looking to the control room making the staff aware of their trying to communicate indicates a need to make a more efficient sound transition between Columbus and Wooster. Whether or not another room is available, an upgrading of the sound system I believe is still desirable. This is not to say that the adult participants were ignorant of the weaknesses of the system, but that their continued ability to adapt to less than desirable situations was present in this case.

Stanley and Muchow (1986) outline the importance and effectiveness of quality audioconferencing, regardless of the visual accompaniment. The regular problems with feedback, poor audio levels, and the need to repeat many of the questions and comments would be eliminated. The management's decision to spend the 15,000 dollars, if the money becomes available, on a new Shure audio management system is a sound investment into the future quality of this overall videoconferencing system. This is not to say that this study suggests that the first 15,000 to become available ought to be spent on the audio, but in the long-run, this is still a needed improvement.
**Staging/Seating**

Fourth, the seating should be arranged in such a way as to allow everyone a fairly equal view of the new monitor. Keeping a row and column arrangement in either of the rooms defeats the rationale for having a larger screen to a degree. This probably means providing a platform so chairs can be raised slightly above the one in front of it and arranging the seats in some type of semi-circular or amphitheater type design. Because of the size of several of the videoconferencing classes (there is at least one undergraduate course taught yearly that utilizes the network with over 50 students).

**Camera/source upgrades**

Finally, the last recommendation for this setting that requires some kind of capital outlay is for the cameras. The reports from the technicians at the Wooster indicate that the tube cameras in Wooster are fading. The color rendition and the resolution the cameras are able to produce are falling off. If a larger monitor were to be used, then the cameras would show a more glaring problem with these visual characteristics. Another suggestion in terms of source upgrades is in a slide projection unit that transfers an image directly as an NTSC composite source as opposed to having cameras shoot images of an already projected slide. Because of the heavy use of transparencies in the seminar course, this is one alternative that would drastically improve the clarity of televised slides.

As stated at the beginning of this section, one improvement often leads to another or is dependent upon another being implemented. The way to have a large screen is to have a larger room that accommodates all the people, the monitor, and any other audio/visual equipment that may be used in a presentation.
To have a better room implies needing a more advanced sound system. There is a potential for administering many of these suggestions in the current room as it presently exists, but possibly the best way to accommodate this process is to begin with an all new room.

**Cost-free (monetarily) suggestions**

If cost precludes any or all of the previous suggestions, there are a number of items the participants and myself believe can be done to improve the system that do not carry any financial cost with them. These suggestions are organized in the same fashion as in the preceding chapter along the dimensions of time utilization, lighting, staging, audio management, shot selection, turn-taking, and camera-monitor-subject relationships, as well as the additional issues of visual bias, affect, and presence.

**Time utilization**

More fundamentally different than any equipment or personnel changes are suggestions as to how to use what is already in place. The method of using the videoconferencing as a one-way conduit of information is cost defeating. Both of the courses I studied could have been taught just as easily with one-way video and two-way audio. This may be a moot point for the College since there is a trade that offsets broadcast time and doesn’t involve real dollars. But even in terms of saving equipment expense and maintenance, there was little need to have the full two-way audio and video, except for the fact that the seminar course rotated origination sites on occasion. The international students course fit a one-way video videoconference scenario exactly.
Many students were desirous of having more opportunities for interaction in the videoconferenced courses. Even among the international students who were content to sit and listen to the instructor were several who went to great lengths to obtain interaction with the instructor (the student who drove nearly every week to the instructor’s office is one example). One would not need to eliminate the full two-way functions if a shift in philosophy were adopted by those facilitating the courses. Encouraging less structured and more discussion-oriented presentations would be one way to make use of the expense currently being employed by the college. If the time and energy has already been expended to create the current system to facilitate interaction, why not have interaction?

Lighting

Probably one of the simplest suggestions is to maintain a regular schedule of setting the color renditions on the monitors and the white balance on the cameras. Participants did not see inherent flaws in the current lighting system of fluorescent overhead lights, but this simple routine would improve the rendition of the subjects on the monitors. As opposed to using fluorescent lights, a diffused white light source (5300° K or so) or yellow light source (3200° K or 3400° K) diffused above and slightly to the front of the subjects being broadcast would help shift colors to a more easily balanced level and would help reduce the tendency for displaying dark eye sockets and heavy shadows under the nose.

Staging

As stated earlier, arranging chairs in such a way as to allow participants a chance to not only view the monitors but to see one another would be a benefit. In the courses I studied, there was never a need for 40 chairs. Removing the
unnecessary chairs is one way to encourage participants to sit together and to sit in an arrangement conducive to effective camera shot selection. Having participants ending up sitting in three bunches around the three monitors does not allow for a sense of community.

The obvious problem with this is that someone must take responsibility for seeing that chairs are moved, added, and removed from the current rooms in Columbus and Wooster. However, the advantages this may create may outweigh the negative aspects. There is also the potential to require students who enter the room to bring in a chair if they are physically capable. Though this has an obvious down side of placing an added burden onto the students who are already coming into a unique situation.

Audio Management

The only suggestion that arose under this topic that is not cost related is closer monitoring of classroom activities by the attending technicians/producers. Since the levels are controlled manually at this point in time, making sure that the technician is listening and watching both sides of the link would be in order. However, the technicians outlined clearly that they have multiple responsibilities and the classes fall low on that priority list.

This may be an area where training students who are taking these courses to run the basic equipment may be productive in the long run. This would allow the technicians to fulfill their own responsibilities without forcing them to become interested in topics or subjects they do not know or like. The obvious down side of this suggestion is the greater risk faced by the college in terms of equipment care and maintenance. Students who were trained for these types of
responsibilities would need to be accountable to some individual for their activities in the control rooms. Either to the professor in charge of a course, or to the administrative personnel who typically oversee these functions. Possibly extra credit or some other incentive might be associated with the added accountability.

**Shot Selection**

Another suggestion that may prove to be a useful experiment is to allow students in the videoconferenced courses to manipulate shot selection and lighting demands. I presented this suggestion to several of the students to see if they would be interested in the possibility. The response was a qualified yes. Students thought it may be fun to work in the control room and follow the course, but they voiced the concern as to whether it might take away from their concentrating on the topic at hand.

**Turn-taking**

Closely related to the suggestions under time utilization is this category of turn-taking. Instructors seldom looked at the monitors to see if people were “understanding” the material being presented. In the international students course, interaction was, for the most part, discouraged entirely. What the literature suggested before the study was initiated and what I am inclined to believe from my own thoughts and the comments of the students, is that the college should not alter the two-way audio and video, but in fact, should allow for the participants to incorporate the videoconferencing for its designed objective, conferencing.

One way to force instructors to respond to students at a distance would be to incorporate an audible or visual cue to let a person know that someone at the
other end has a question. Providing some type of small switching device to each of the participants is a possibility, but may prove to be an expense and an annoyance in the long run. More preferable would be the voluntary implementation of discussion oriented questions by the instructors. Looking for opportunities to allow participation would increase interaction by a large margin.

**Camera-monitor-subject relationships**

One simple improvement is to change the viewing angle of the cameras that send the signals of the instructors to their respective destinations. Particularly in the Wooster site, mounting a camera on a tripod and placing it at eye level and more direct would help give the impression of the presence the students say they need in the interaction. The existing room in Columbus is not so easy to arrange a camera with these viewing parameters, but a dollied camera could be rolled just in and out of the way at the beginning of the class periods. The down side of this suggestion is that the joystick controls that allow for pan and zoom functions for the ceiling hung cameras may be lost. The ideal solution would be to retain the controls on the tripod cameras for remote operation. But here, there may added expense involved.

This placement of cameras helps to facilitate the impression of direct eye contact, as well as a more aesthetically pleasing viewing angle. Direct eye contact was found to be a significant element in videoconferencing (Acker & Levitt, 1987), and here in this setting, it proved to be a component not present that seemed to weaken perceptions of the participants at the other site.

Taking more time in the beginning of the quarter for producers and technicians to share their experiences with the link would prove to be very
valuable, I believe, to the overall success of these courses. The one five minute speech at the first of the quarter for the one class was not enough to set a positive tone or to make the participants more aware of the realities of the medium. Having the producers show clips from classes or shows that illustrated how simple ideas affected the visual content of the course would place concrete examples into the minds of both the instructors and students.

I do not think mandating instructors to go through some type of media literacy course or training session on how to use television would help because of the already busy time of faculty and the added potential for running into barriers of pride and experience in teaching. But having a short 30 minute session at the beginning of each quarter for all of the participants may help alert a number of people to ways of making the lessons more presentable and ‘learnable’.

Affect

This is an area where I believe more in-depth training may be of some help. Since roughly half of the students displayed some initial apprehension concerning the use of the videoconferencing technology, an orientation offered by the staff of the Agricultural Communications Division is in order. A comparable situation would be the one and three-hour training sessions offered by the Academic Computing Services for faculty/staff and students to become more acquainted with the computer technologies utilized on campus. When registration indicated that a student had enrolled in a course who had never taken a mediated course on campus previously, that person’s name should automatically be placed onto a mailing list that informed the person about the videoconferencing orientation.
This may be a small step and does not guarantee the individuals who need the services the most will arrive, but it does offer an opportunity that does not exist presently and would be of help to faculty and students alike. Making faculty aware of such programs could also facilitate the faculty members encouraging certain individuals to take advantage of the service. Some expense may be incurred, but compared to the overall operation of the videoconferencing facility, it would seem nominal.

Presence

Videoconferencing has the capacity to facilitate interaction. If interaction is not taking place, then why bother with the added expense? The only possible answer to this is that a full two-way audio and video system helps bring the participants together in a way that they could not do otherwise, even if one end of the link never interacts or comments. The simple fact that the participants know they CAN interact if they want may be enough to help make them feel more present with the other participants.

Previously named suggestions of arranging more direct camera angles, softer forward lighting, setting color rendition, and matching the components from both sites all influence this notion of presence. Being appear to see into the eyes of the person doing the talking if a person wants, having a choice over what is being seen and heard, and the ability to interact with face-to-face ease all are important. In other words, the suggestions should be seen and carried out as a unit as opposed to isolated improvements with little overall effect. Conceptually, the joint effect of all of these suggestions working together should be greater than
The findings reveal at least three areas that are fundamentally important for theory development pertaining to videoconferencing environments and potentially all distance learning technologies. These important constructs are 1) adaptation of the participants to the intersection of technology, topics, and teaching and learning styles; 2) affect in the forms of apprehension and novelty as a major element of first-time users and its relationship to presence, and 3), the notion of presence itself as being the factor that prevents videoconferencing from being considered equal to traditional face-to-face instruction.

Adaptation

Adaptation as an integral concept for education has been around for some time. This term usually refers to the ability of school systems, curricula, or instructors to bend or shape to match the needs of the learner. Certainly institutions need to be open and adaptable. Rigid curricula and teachers are a recipe for frustration for the learner and eventually for the institutions, particularly when applied to distance learning courses (Wolcott, 1991). But in this study, adaptation is a quality displayed not by the institution but by the learners.

As mentioned in an earlier chapter, adult learners are ideally characterized by qualities such as self-directedness, high motivation levels, and more disciplined approaches to education (Knowles, 1978; Merriam & Caffarella, 1991). One quality that seems apparent from the interviews and the exposure to
the students in the videoconferencing course over time is their ability to adapt themselves to the technologies and courses.

Hughes & Graham (1985) see adaptation to learning environment as a developmental step for adults in life-role changes. Their model of life role cycles is outlined in four stages: initiation, adaptation, reassessment, and reconciliation. Though entering into a new class dealing with a new technology may be considered a life-role change, this study suggests that adaptation is an on-going process in learning until such a point that the learner/facilitator is comfortable with a certain level of achievement.

In studies that compare technology-based instruction to traditional face-to-face instruction, the use of numerical test scores becomes a moot point. The more significant question becomes: To what degree has the adult learner adapted to a technology, or for that matter, to a particular instructor? Regardless of the final test score, the important element in the instructional environment may not have much to do with instructional style as much as it is concerned with how an instructional style permits the individual to accurately assess and adapt to the learning environment.

In the education literature of the recent past, issues have been debated, psychometric tests measuring affect and intelligence dimensions have been administered, quantified survey results distributed, and finally, suggestions are made for adapting the curriculum to these individuals. Many discussions are centered around institutional changes or individual teaching style preferences. Little attention has been paid to what lengths students will go to accommodate new, different, or otherwise challenging circumstances in the educational setting.
once they leave the classroom or even to what lengths they go to flex in the classroom setting. The success or failure of the students may be more accurately ascribed to the individual learner’s ability to cope with whatever environment s/he happens to find him/herself than to a particular institution’s teaching methods or topical orientation.

The students in these two courses displayed a remarkable bending and molding to fit the situation. There was little flexibility shown by the instructors and no flexibility shown by the institution to allow for better facilities, etc. The students adjusted their seating to make themselves comfortable with the setting. Students would bring in audio recorders to aid in their comprehension by studying the material and the language outside of the class time. Students would ask questions of each other if they were not permitted to ask questions of the instructor.

The implications are when studying a mediated course, outcome results may be deceiving. If a mediated course and a traditional face-to-face course covering exactly the same topics show no statistically significant difference with respect to outcome variables such as test scores or grades awarded, the missing element of the study may be the degree to which a learner went out of their normal mode to match the educational situation. This adaptation may show up as affect related, but may in fact be invisible unless the individual has been followed on a twenty-four hour schedule and the study practices and learning techniques employed by the student are compared across time.

The difficulty of measuring affect and attitude is clearly outlined in Mueller (1986), but what is more difficult is determining whether a construct such
as adaptation should show up as a measurable attitude or affect at all. One construct that may not be as difficult to measure is the affect related to first-time users of the videoconferencing technologies. This affect, which is polarized along the lines of technophobia and technomania are outlined below.

**Technophobia/Technomania**

Chamberlin, (1983) coined the above heading as the title for this article. These two words, technophobia and technomania, more clearly than anything else in the literature, summed up the findings of this study with respect to affect. American educators are in the midst of a struggle between those afraid of technology and those who love technology. There seems to be few who take an indifferent view to technology, particularly when its application is in education. This dualism of emotion on instructional technologies leads to a breakdown in services offered because of the vast difference of opinions on either side of the argument.

Technologists are going to tend to be more accepting of the technology and those uncomfortable with mediating technologies tend toward the other extreme. In the literature on technophobia in education, the articles deal almost exclusively with the fear that teachers experience when confronted with a new learning technology. Meade (1991), Kassner (1988), Akinyemi (1986) all say that technophobia can hurt instructional technology effectiveness. Their solutions rely on teacher training and gaining familiarity through contact with the technologies. Thankfully, obtaining more money as a solution is not the only course of action.
Creative solutions that reapportion responsibilities of teachers and staff, schools that are willing to abandon obsolete technology systems or sell off technology systems before they are considered useless in order to update what they have are ways of loosening the financial grip. The implication is that in order for universities, colleges, and primary and secondary schools to stay ahead of the technology games and the corresponding affect associated with continual change is to be continually involved.

When dealing with the technophobia of the students, not as much material is available, but the solutions are essentially the same. Consequently, the difficulty with the solutions are the same. How do schools get the extra time and money necessary to provide the students exposure to the technologies they want or need? Administrations understanding that technical literacy is a function of everyday life in the United States would soften the blow to most educational institutions since all faculty would somehow relate their discussion back to the everyday life-world. Instituting or maintaining a curriculum that gives teachers the opportunity to discuss changes in workplace and leisure technology as the goal of the instruction would allow for all involved to become more aware of the difficulties. One other solution seems to reside with outside funding for such projects.

Collaboration of industry with education and government for the purposes of alleviating certain fears is a double-edged sword. On the one hand, there is the issue of control and domination of industry that some do not wish to be further extended into the schools. On the other hand, how else will schools be able to cope with rapidly changing communication technologies and supply industry with
the employees qualified to manage these communication technologies in the future.

Education is caught in a ‘Catch-22’ scenario. If they pursue independent funding, time and energy must be continually consumed in the pursuit of grants which means someone is no longer in contact with the students. If they allow big business to donate hardware and software, there is the potential to place an unnecessary bind on the students as consumers.

Ultimately, dealing with technophobia as it relates to this type of setting can only be appeased by individual contact with another human being who has overcome the barriers the technology may present. Using distance technologies to teach more people with less money may be an administrative allusion. Distance learning may actually require more dollars spent on faculty and staff to allow the students to cope with and eventually master the technology systems.

This perception may burst the bubble of optimism that some new users and administrators have shown for these technologies. There are not only those who are intimidated or afraid of new communication technologies, but also those who are immediately enthralled with the possibilities for new and different ways to communicate. This was the case in the videoconferencing environment, as well.

Though not to the degree that some authors have displayed concerning the potential for new communication technologies, some participants saw the videoconferencing setting as being an interesting “playground.” These were the people who were the most critical concerning the use and continued development of the system toward improvement. This polarized view of technology made
focus groups lively at times. Where this dispute can become ‘deadly’ is when administrators sit on opposite sides of this affect wall.

What is truly damaging about this process is that many have been enthusiastic about a certain instructional technology and pursued their enthusiasm with financial resources and time, only to have their enthusiasm dashed on the rocks when the newness or novelty of the technology wore off. Participants would become more vocal about the course, enrollments would fall, and somebody ends up being hurt. The question becomes, how does one anticipate if a technology system will work effectively? This determination may rest with being able to understand the needs of participants for interaction and the associated affect.

This effect of affect may be attributable to the varying degrees participants need and/or desire closeness or proximity with participants at another end. This closeness leads back to the construct called presence. If I enjoy being close to people and the technology makes me seem distant, then I might fear it. If I like distance and the technology brings me closer than I like, I may fear it. If I like distance and the technology provides that distance, then I may be enthusiastic about its potential. If I like closeness and the technology provides that closeness, then I may be enthusiastic about its potential. Finding out and exploring what this presence is, is the function of the following section.

Presence

The participants in the study in both classes seem to agree with Bretz (1983). As discussed in the previous chapter, the students were of one mind with respect to increasing monitor size. Everyone wanted a bigger monitor. The
reasons varied, but the net suggestion was to use bigger screens. The students also created unique adaptations in terms of seating and staging that altered how they experienced the videoconferencing time. Based on the participants’ comments and actions in the course, presence in this instructional videoconferencing setting was mediated in part through perceived proximity. In addition to this component, the participants also indicated that dimensionality/depth, perceptual flexibility and decision-making, detail/diversity in perceptions, and interaction also were integral components of presence.

Television does not have the capability to show depth, though it does have the ability to illustrate perspective. However, depth perception of the viewer can be fooled to a degree with the lighting used in a shot and the staging selected. What it cannot do at all is allow for touch between videoconferencing participants. A teacher standing over the shoulder of a student has more impact on the mind of the student than an individual sending an image that appears to be looking over the student’s shoulder. Providing a pat on the back or the sound that pounding on a desk send when trying to illustrate a point are not a part of the repertoire of the technology. The degree to which an individual needs to be near another individual in order to feel needed and valuable may act as a strong predictor of whether or not the person is a good candidate for instructional videoconferencing.

This may reflect certain cognitive functions related to development and learning. To use terms borrowed from Vygotsky (1960, 1978), there is a zone of proximal development that facilitates the learning process. To Vygotsky, this zone was the collision of a person’s own developmental level with the context that
brings that level to life—a teachable moment. Vygotsky believed that the teacher, the student, and the environment were all equally responsible for the teachable moment. The question this raised for this project was: what exactly contributes to making the videoconferencing context ready for the teachable moment? At least part of the answer lies in the ability to allow for perceptual decision making and flexibility (giving a participant control over what and how s/he attends in a mediated setting).

Perceptual flexibility or perceptual decision making is another aspect of presence that is difficult to simulate. Several students commented on wanting to be able to zoom in on a slide, or being able to look around the room, but the television monitor did not permit this. Having a larger screen with more lines of resolution may help deal with this issue. For example, if a large screen high definition television were to be used as the visual medium, then a relatively wide shot on the large screen would present many of the same choices for attending to information as being there in person.

One instructor posed an interesting problem, he wanted students to smell certain extracts from plants. There were jokes in the class about “smell-a-vision”, but ultimately the solution was to ship a case of bottles to both sites and have students pass them around. As Campbell (1776) might suggest, the inability to use senses other than sight and sound may eliminate some from being able to fully appreciate the learning situation.

Current NTSC standards with even relatively large screens do little to approximate either the detail of a face-to-face setting, nor does it have the capacity to cover as wide an area. Bigger monitors help improve perceptions of
proximity and certain elements of detail in the videoconferencing experience, but can be pushed to an extreme that only increases the degree to which a person notices information is being omitted from the signal. However, if a person is given control over what the camera sends, then they may be more engaged in trying to establish presence. There is a down side to this as well. If an individual has an undisciplined approach to sitting in the classroom and constantly wants to manipulate the camera, then the attention deficit may be exaggerated instead of brought under control. The teachable moment is lost in the shuffle.

Finally, there is an aspect of presence that sounds redundant, but is being used as a term to describe the collective impact of all of the components working together—interaction. Mediated interaction is more than the students and instructors talking and looking at one another, it is the synergistic effect of being a certain distance from a certain sized screen seeing a certain shot content. This is layered with the ability of the people to choose what sense they use and where they are directed in the encounter. The perceptions are layered one on top of the other to yield an interaction. And again, we come back to interaction—the one event that lead Schutz to consider what a truly social science should be studying.

Interaction, facilitated in a mediated setting by an overlaying of perceptions, proximities, and choices, inhibits or fosters an environment conducive for the bringing about of a teachable moment. Presence, zone of proximal development, perceived proximity, the teachable moment are all interrelated constructs that work together in the development of a theory that helps to understand learning. These, together with the concepts of adaptation and affect development as they relate to instructional videoconferencing, provide more
material for building a useful theory of mediated interaction. These elements can make the initiation of a renewed exploration of theory development for distance learning. The concluding chapter discusses some of the limitations and strengths this study has in heading toward a higher plane of conceptualization.
Chapter V
Summary/Conclusion

This concluding chapter is divided into four sections. Section one summarizes the original research question and the procedures used in the interpretation of the findings. Section two addresses the conclusions of this project. Section three deals with the particular strengths and limitations this study brings to bear on the field of instructional technologies. The final section includes closing remarks and considerations for the future advancement of this work.

Summary

How can an instructional videoconference be made more successful from the perspective of adults using the system? This was the original question that lead to this dissertation. Although an easy question to ask, getting to an answer seemed a daunting task. In the end, the research approach that seemed most reasonable for the question was a longitudinal, naturalistic exploration of an existing videoconferencing system used for graduate and undergraduate education. The system studied here was employed by a college of Agriculture at the Ohio State University.

Participant observation, face-to-face interviews, focus-group interviews, and videotape analyses were integrated in such a way as to provide responses and their corresponding contexts. Through this integration, interpretations are provided and the reader is given a glimpse of the complexity of an instructional videoconferencing experience.
Conclusions

The most significant factors revealed in this process dealt with the social aspects of the participants. Specifically, the constructs of adaptation of adult learners, affect for or against media and its relationship to presence, and the notion of presence itself were all seen as critical factors in reaching some level of success in the two-way videoconferenced classroom experience. These elements resulted from the interaction of more narrowly drawn constructs such as time utilization, staging, shot selection, turn-taking, lighting, camera-monitor-subject relationships, and audio management.

By manipulating the two-way instructional videoconferencing environment from both technical and philosophical vantage points, the possibility to make the overall experience more satisfying for the users is possible. Allowing time for interaction, giving participants a room that allows an uncrowded and natural atmosphere for learning, giving control of shot content over to participants, and providing visual and audio production devices that more closely approximate human presence all contribute to the perceived desirability and effect of an instructional videoconference. Though the medium has certain shortcomings, motivated learners are willing to adapt to less than ideal conditions if they feel there is a significant incentive to do so.

Determining who is a motivated learner and who isn’t is a daunting task, but the literature referenced in the first chapter brings to the fore that the new traditional student is in a category that often fulfills this function. The use of mediating technologies in the classroom can be said to offer more to this population than possibly to any other learning group. The need of this population
to have flexible time and space in order to manage the multiple responsibilities encountered in adulthood means that the advantages of the technology system for this group may outweigh any of the disadvantages associated with reduced presence or high levels of affect against the system. Thus, instructional videoconferencing is a means by which learning can be delivered to students who might not otherwise have the opportunity.

As this particular study relates to the general field of education, the participants in this study showed that learning cannot be viewed as an activity that takes place one hour, three times a week, but is better seen as a process that occurs more outside of the official classroom setting than inside of the classroom. Consequently, even though a technology system may be quite extraordinary for the learner and/or the facilitator of the learning experience, this does not necessarily imply that the learning process as a whole is altered or changed significantly.

Students who adapt or cope with the various learning situations must be viewed in a broader frame than is traditionally available in the literature on education. Isolating time blocks as distinct learning events violates the premise that learning is a process and that the process when done effectively results in sustained change in thought or action. This would seem to be an obvious point, but the literature in education is filled with studies that conduct quasi-experimental studies that manipulate a single variable in the classroom setting only and then compare those groups using inferential statistics. These may show significant differences, but what none of them illustrates is whether or not the learner was compelled to go to extra lengths to adapt to the manipulation. The
possible result is when an intervention yields a statistically significant difference that is interpreted as a positive effect, but in reality, the effect may be attributable to the extreme difference in learning patterns or the genuine weakness of a learning intervention. Students may have gone to greater lengths to cope with these changes outside of the classroom and the result is better performance. The risk, then, becomes one of damage to the motivation of the student if a change is brought in as a permanent and the student becomes even less involved with their own learning activities. The adaptation may drop off over time if not given positive reinforcement that the changes to learning behavior are being rewarded.

Limitations

There are several factors to consider when reviewing this study that are potential limitations of this research. First, the nature of the courses being studied may be a potential weakness. Agriculture, in the form as it is studied in this college, is a highly technical, positivist-based science curricula. This atmosphere may make the population of participants predisposed toward disregarding certain areas that may be lacking such as interaction or discussion. The fact that these were highly technical courses may also make transferring information gleaned from this report to other humanities, arts, and social science courses difficult since the expectation levels of those students and instructors may be different.

Another potential weakness of this study is the fact that the population of participants were predominantly male. The views offered by the members of the videoconferenced courses may reflect a gender-biased perspective. Efforts were made in the data collection process to insure that women were allowed to express
their views openly. In the focus groups, personal interviews, and even causal
cconversations I attempted to allow their opinions to be heard.

The events chosen here were moments that stood out as unusual or
particularly significant. This was a fact that relied upon the perceptions of the
individual researcher. Therefore, if there is a weakness in the reporting of the
data, the attributable source is the researcher. Where multiple responses matched,
this was considered an unusual or significant event. When a sequence led to some
unanticipated action, this, too, was considered a significant event. Other
conclusions might be drawn from the available data if the researcher was viewing
the information from a varying perspective. But, the goal throughout this process
has been that if there are other possibilities, these would be in addition to those
already made.

One of the goals of this study was to make the environment better
according to the thoughts and opinions of the participants. Some visible change
was noted throughout the pilot tests and data collection periods. But, the
researcher could have been more vocal with his opinions or pressed the study
subjects more concerning what types of interactions ought to be taking place.
These options presented philosophical dilemmas equal or even surpassing that of
simply observing without an eye toward change. Making decisions about what is
better for a group before the group has had the opportunity to make those opinions
known places the responsibility of change primarily on the researcher. The
researcher potentially becomes a tool for domination or the agent of adherence to
a particular world-view.
In keeping with the theme of Argyris, Putnam, and Smith (1985), this researcher did share thoughts, ideas, and suggestions to how those might be administered to faculty, students, technicians, and administrators involved with the project. Many individuals were faced with considering possibilities for improving the instructional videoconferencing courses.

The potential for future change in the system is still present. As reported earlier, executive summaries of final suggestions and input from the subjects will be delivered to administrators, instructors, and technicians who were involved with this project. By delivering the information to the policy makers, the thoughts and feelings revealed through the study process may continue forward without the extra impetus of an outside researcher.

**Strengths**

The advantages or strengths this study offer is in the strategy used to study the mediated classroom. Previous studies devoted to examining instructional technologies are often comparative--looking for significant statistical differences in outcome variables such as test scores between traditional classes and mediated courses. There is certainly value in comparative studies, but those in instructional technologies typically do not attempt to ask or explain if there are other factors besides grades that matter to the students and facilitators of the course.

This study is an initial foray into using a more longitudinal and comprehensive approach to studying instructional technologies. This approach is certainly not new to social, education, or communication sciences; but it is unique in this particular context. Processes that lead to attitudes and interactions
became more of the focus of the study rather than outcome performance by the
students or instructors.

By going beyond the simple end products and outcomes, a more
comprehensive approach to understanding the coming together of different social
domains is possible. The potential in this approach to research is to allow for a
frame to look at phenomena other than instructional technologies. By continuing
longitudinal, ethnographic work that studies the processes leading to interactions
and interaction quality in instructional technology, there is the potential to gain
some more understanding of the larger workings of our society.

This understanding of the larger social world is an element of theory
development. This study provides a way for those in instructional technologies to
begin examining their own situations more comprehensively. Allowing others to
view current instructional technologies to consider how they lead to a particular
theory is unusual and ultimately is a strength for this project.

Future Research

One of the aspects of instructional technologies that seems clear in this
study is that these systems must be viewed as options for special circumstances
and not as replacements for the traditional classroom. There was a minimum of
three to four outside individuals who were supported by the university to
accomplish the successful videoconference. This study went into some detail to
describe how much more could be done with more resources. Seeing instructional
videoconferencing as a way to increase student contact hours while paying the
same number of faculty and staff is an idea whose time should end. Creating and
maintaining quality in any mediated course, be it videoconferenced, computer
assisted, or even some other less sophisticated technology requires more not less
time to consider and prepare for the unique elements of the communication
technology.

As stated in the first chapter, many have pronounced that instructional
videoconferencing is a cost-efficient approach to learning. In contrast, the courses
examined in this study illustrate that instructional videoconferencing can be more
cost intensive than many traditional courses. If one increases the audience size of
instructional videoconferencing, then the adoption of this broadcasting model
seems to violate another important idea found in these courses--the notion of
presence. A cost-efficient model for supporting initial instructional
videoconferencing expenditures seems inappropriate.

So, what do proponents of this approach to instructional delivery rely on to
support their ideas that instructional videoconferencing is a good use of
resources? As indicated in the responses of many of the participants, the
argument that needs to be raised in this process of weighing what is best for
education and for the facilitators and students in these institutions needs to
address the issues of access and equity. Who has access to the needed or wanted
learning experiences? Is education attempting to provide equitable learning
opportunities for the various populations and locales?

As indicated in this study, many participants see the technologies that are
employed in an instructional videoconferencing setting to be a benefit if they are
used to allow the movement of time and space. If a student has the ability to
attend a course offered by an expert who is a long distance from the student, then
this movement of space is a potentially great advantage of the technology system.
If a student or facilitator is able to move time barriers by scheduling classes at times not possible in a traditional setting (and later using recorded sessions to review, etc.), then the movement of time also is a potentially large advantage of instructional videoconferencing technologies.

As stated in the first chapter, the population of students who are most inclined to benefit from this movement of time and space are those individuals who I have called the new traditional student. Students who are returning to school while maintaining full-time careers, families, and other responsibilities that are impossible to shirk are the ones who can benefit the most from this type of a technology system. Students who are full-time on a campus with few other tasks bearing down on their lives are not inclined to see instructional videoconferencing as a valuable exchange for the traditional learning experience. However, those who are trying to maintain these multiple responsibilities can be given much greater access and shown a higher level of equity than can be demonstrated within the confines of the traditional educational institution. Here, the question then becomes one of how to finance these projects if they are not necessarily revenue generating.

One way to avoid an upward financial spiral is for colleges and universities to collaborate. Sharing faculty while each university counts the course as a full load is one way of improving the scope and quality of videoconferencing courses. The difficulty with this is that the universities must decide how tuition would be managed. But colleges and universities, especially those with smaller numbers of faculty, could benefit significantly by allowing a
cooperative position with respect to videoconferencing and not as a way to infiltrate other territories previously out of bounds.

By allowing different universities to work together, collaboration offers a side benefit of having students seeing a value-added approach to learning as opposed to seeing their tuition dollars and state-revenues buying less and less. As with this study, there are those who believe that if the teacher is not in the room, then somehow this educational endeavor is not worth as much. If a university were to advertise and operate a course by saying that in the class you will have an opportunity to communicate with two experts on the same topic, then the student may begin to develop the attitudes that administrators are trying to maintain quality of learning.

The other benefit of collaboration is that the medium provides a means for faculty to work on projects and publications together for continued personal development, growth and promotion. In a time when publishers are more selective, journals are cutting pages and revenues, and universities and colleges are expecting more outside productivity in terms of obtaining grants and research fellowships, collaboration in a mediated course provides a way to share the burden. There will be some cost involved in the initiation of such collaborative projects, but in the end the costs should return back as investment capital when faculty/staff are more able to meet their expectations with fewer frustrations and more students are having the opportunity to learn differing viewpoints on the same topic area.

Finally, one area reviewed in the literature for this project that appears to be severely lacking deals with the assessment and value of courses and their
design. One can find row after row of cookbooks that provide the ingredients for how to make an instructional telecourse, but little on the conceptual forces that drive this same telecourse. What are the values being promoted in the use of certain communication technologies? How do educators use these new communication technologies to expose young and old minds to new contexts, experiences, and events that might cause the person to re-think their positions or views? Future research needs to address these questions of value, along with the other issues of access and equity approaches to learning versus cost-efficiency models of mediated instruction; and the use and importance of time and space movement through technologies.

Closing Remarks

What is the conclusion of this project? The conclusion here can only be just the beginning. This ethnographic exploration of a technology-mediated course reveals that the development and implementation of a new technology system is inextricably linked with a specific context made up of technologies, policies, and users/consumers.

Finally, the direction of instructional technology needs to take a more critical position of itself. The discipline of educational technology has been stuck in a loop that promotes information processing, linear design, one-way broadcasting of courses, and little self-reflection. More time and energy on the application of cognitive theory to instructional design, an assessment of objectives and goals for mediated learning, and a general push for more types of learners being exposed to more types of courses is necessary.
My desire as a researcher and my hope for many others is that this work adds an energy and enthusiasm to the pursuit of answering questions that are meaningful and important to the society at large. I hope this study has allowed you to take a peak into your own discipline and your own philosophies concerning instructional videoconferencing and its role within the broader context of users and policies.
References


Bangkok Project (1992). DEOS-L/ Distance Education On-line Service List.
Computer discussion, Penn State University List Owners, November 1992.


Educational Television, 14(3), 213-225.

Bernstein, R. J. (1976). The restructuring of social and political theory.
University of Pennsylvania Press.


Education. Proceedings of the Third Annual Conference Applying New
Technology in Higher Education, March 5-6, Fort Worth, TX, pp. 58-71.


Lifelong Learning, 11(5), 8-10,24.

Cable to Address Large Enrollment Problems in Engineering, Issues in Higher
Education. Proceedings of the Third Annual Conference Applying New
Technology in Higher Education, March 5-6, Fort Worth, TX, pp. 84-96.

Carey, J. (1991). Plato at the keyboard: Telecommunications technology and

Carl, D. (1986). Developing faculty to use Videoconferencing to deliver
university credit courses over cable and satellite. Canadian Journal of

computer communications technology to distance education. Media in
Education and Development, 19(2), 92-96.

(2462), 50-51, Nov.

York: Pyramid Communications.


Jacobs, M. (1992). Personal interview—Head of media services for the department of Agriculture—The Ohio State University. October 12.


Appendix A

Instrument 1--A general guide for the focus group interview

I. Introduction

A. Thank members for coming to this session, appreciative of time
B. Encourage members to be open and honest with responses. If they think differently from their peers, that is OK and actually may serve the best interest of the study if they express their views. Do not be intimidated.
C. Feel free to contribute at any time. Please allow others to finish their thoughts before you speak, but please feel ready to contribute.

II. Questions

1. Given a choice, would you like to do this class in a traditional (face-to-face) classroom or would you select the present mode of delivery?
   Follow up: What are your reasons for keeping/changing?
2. What do you find most appealing about videoconferencing in the classroom?
3. What do you think can be done to make this system better for your own learning?
4. What have you gained in this experience that you could not get in a traditional classroom?
5. How did the physical arrangement of the classroom affect your ability to interact in the classroom?
6. What contributions did you make to the course? (asked questions, suggested changes in format, etc.) Was this different from how you typically behave in a traditional classroom?

7. What would you do to improve the ...
   technical aspects of the delivery of the course?
   the audio in the videoconference?,
   the arrangement of the classroom?
   the size, type, and number of monitors
   pedagogical aspects of the course?
   teacher style(s)?
   use of audio/visual supplements?
   organization of course?
   Interaction between sites?

8. What did you enjoy about the course? Do you think your perceptions were hurt, helped, or kept the same because of the videoconferencing?

9. How did the instructor utilize the capabilities of the medium? How could he improve?

10. If given the option, would you enroll in a course that was delivered in this way over the same material delivered in the traditional way in the future? Why or why not?

11. How successful was the medium in creating a sense of community between the sites?
Appendix B

Instrument 2--One-on-one general interview guide

I. Introduction

   A. Thank member for coming to this session, appreciative of time
   B. Encourage member to be open and honest with responses. If they think
differently from their peers, that is OK and actually may serve the best
interest of the study if they express their genuine views. Do not be
intimidated.
   C. Feel free to contribute at any time. Ask clarifying questions.
   D. Explain that their opinions are confidential. Exact wording may be used
in the write-up of a dissertation, but identity will be cloaked.
   E. Obtain permission to record the interview.

II. Questions

1. What is your level of study? Major focus?
2. Why did you enroll in this particular course?
3. Were you aware that this course was a videoconferenced class when you
 signed up? If yes, did this affect your decision to take this course in any way?
4. Have you ever been in a course that used electronic technology to deliver the
course material? Videoconferenced course? If yes to videoconferenced, did your
previous experience affect whether you wanted to take this class or not?
5. What did you like about the professor of this class/ students in the course?
   What about him/her/them did you find positive or most appealing?
What about him/her/them did you find distracting or not so appealing?

6. How effectively do you think the instructor(s) used the medium of videoconferencing in this class?

7. If you were taking/teaching this course, what would you have done differently as the student/instructor?

8. How would you rate your knowledge of new technologies like videoconferencing?

9. Did you feel you were hindered in any way from contributing to the discussion in class because of the technology? If yes, what about the system made you feel hindered?

10. What do you think you would have done if you had control of who you could see when on the television monitor?

11. Would you say you watched the television monitor as you would a prime-time entertainment program or more like a regular classroom? How are these different in your own mind? Examples?

12. Would you use this type of medium as your principle medium of instructional delivery if you were teaching in the future?

13. Would you rate yourself as a highly involved student in traditional classes? Would you say you talk frequently, sometimes, or not at all in your classes? What about in this class?

14. If given a choice, would you take another course from this instructor/teach another course over the medium in the future? What made you decide one way or the other?
15. If given a choice, would you take another course that was offered via this videoconferencing medium?

16. What was the overall value of this course to your areas of interest?

   Do you think this perception was affected by it being delivered over television?

17. How do you think other class members would rate this class?

18. Do you think the instructor enjoyed using the television as a medium? Did you enjoy using the television as a medium for delivery?

19. What other forms of electronic communication did you use to carry on a dialogue between you and other students/instructors (i.e. e-mail, voice mail, answering machines, fax, etc.)?

   If you did not, did you have access to any of these technologies?

   If you didn’t have access, would you have used them if you did?

20. Do you enjoy using a computer? Do you own one? For what kinds of applications do you use it? Do you think people that regularly use computers would find this course more or less attractive? For what reasons? Examples?

   Is there anything else you would like to say about this course?

III. Close

   A. Thank respondents again.
Appendix C

Supporting Documents
Message 10/98 To xxxxxxxx Nov. 23 '92 at 11:00 am EST
Subject: xxxx ???? Videoconference
To: δαδαμομαγνυσ.αχσ.οημο−στατς.εδυ (Δενισ Ω Αδαμοσ),
    κυμναμαγνυσ.αχσ.οημο−στατς.εδυ (Ωου−Λι Χυμνανγ),
    ξυρραναμαγνυσ.αχσ.οημο−στατς.εδυ (θοσεπι E Χυρραν),
    δνακεπαμαγνυσ.αχσ.οημο−στατς.εδυ (Δεβρα Λ Κνακε),
    παινεμαγνυσ.αχσ.οημο−στατς.εδυ (Τιμωας E Παινε),
    φοχημαρτμαγνυσ.αχσ.οημο−στατς.εδυ (θανετ M Σχημαρτς),
    περπακτεμαγνυσ.αχσ.οημο−στατς.εδυ (Παοαν Ρεπακτασα)
Date: Mon., 23 Nov. 92 11:00:20 EST
Cc: mellis@magnus.acs.ohio-state.edu (Michael E Ellis)

Hi! My name is Mike Ellis and I am conducting a doctoral study on the uses of instructional videoconferencing. Prof. Lagrimini provided me with the names of the people that are in his seminar and you are one of those people.

I realize this is a busy time, but the Department of Communication and the College of Agriculture have a strong interest in this instructional technology and your input would be the field test of a series of studies that will be using the Ag system. Your input will make a difference in the eventual utilization and improvement of this technology.

I would like to meet with about 5 people individually and with a group of 5-7 for face-to-face and focus group interviews. For the group, I will provide pizza and pop, for the individuals a nice soothing cup of tea.

Please think if you could spend between 45 - 90 minutes talking about your experiences in the Hort 804 seminar. My hope is your time will result in real improvements in the future.

I will be attempting to contact you by phone, if I can get a current number. But as you may know, getting a hold of graduate students can be tough, so just hit 'r' and let me know what times would be most conducive to your schedules in the next ten days.

Thank you for your time and consideration.
Mike

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January 5, 1993

Denise Adams, etc.

Dear Ms. Adams:

I just wanted to thank you for your participation in our study on instructional videoconferencing. I am sure that your input will prove useful to the study. My hope is that the combined input from all of the individuals that have participated in this process will aid in improving the current videoconferencing system.

If you have any questions at all concerning the study or the system, feel free to contact me. I will be happy to help in any way that I can.

Sincerely,

Michael E. Ellis
Appendix D

Executive Summary

Uncovering Presence: What adult participants say enhances instructional videoconferencing.

Michael E. Ellis

Abstract

The College of Agriculture's students, faculty, and staff were the subjects of an in-depth study relating to the use and perceptions of the 2-way videoconferencing link between the Columbus and Wooster campuses. Described here is a brief summary of the methods and the resulting suggestions as they related to this mediated system of instruction.

The Method

The philosophy and methodology of this study was one of context and action. The researcher attempted to allow participants' thoughts and feelings concerning instructional videoconferencing to be revealed in the midst of a broad context of important factors. The hope was these thoughts and feelings would lead toward improving the instructional videoconferencing system. Consequently, the methods used in this study were ethnographic and naturalistic with an eye toward change.

Two courses were used as the primary data collection sites during the spring quarter 1993, one of which served as the site for field tests (fall quarter 1992) and the pilot study (winter quarter 1993). The researcher participated in a total of four sections of courses delivered over the videoconferencing link. These four sections of these two courses proved to be a rich resource for this project.

Participants were interviewed in focus groups, face-to-face (one-to-one), and casually in conversations; observed from the perspective of a fellow participant; and finally, observed in retrospect on videotape. Using multiple strategies was considered an important step in ensuring the validity and usefulness of the data collected. Through this approach, the final dissertation was an analysis of the comments, actions, and context which lead to the following series of suggestions.

The Recommendations

Practical Suggestions for Improvement

Resource-related improvements

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The difficulty with making suggestions for improvement based on resources available is that one improvement may be tied or dependent upon another also being implemented. If the College of Agriculture had enlisted the help of telecommunications and education consultants at the outset, there is a possibility that these suggestions would not be necessary today. But the fact remains, there are a lot of improvements the College can make if they can afford the expense. The following suggestions are listed in order of priority as they emerged from the participants and my involvement with the videoconferencing system.

1) **Larger monitors**

Clearly, from the comments made by the diversity of participants, the major concern of these groups related to the visual components of the courses. Students wanted more time to view certain graphic details, they desired a more attention grabbing atmosphere. The instructors were not as much in agreement with the attention grabbing part as they were interested in seeing more detail. All the instructors and students felt the first improvement to be made to the videoconferencing classrooms is to include a single, large screen monitor as the only viewing medium.

After some thought and reading, I am in agreement with the participants' suggestions. The consensus of their opinion, and the work by Bretz (1983), some of my own work (Ellis, 1992b), and the recent practical articles by authors such as Lund and Warren (1992) suggest that a large screen is an appropriate device as long as the screen is not too large and the seats are not too close to the viewing screen.

2) **Room changes**

Secondly, the participants' felt that the arrangement of the room, at least in Columbus, needed to be such that it did not distract from the course. They desired more space for the students and instructors that would accommodate interaction among participants and better viewing angles to the monitor. This implies that other facilities be located that could operate as a video classroom and only as a classroom. The sharing of duties for Kottman 244 as a production/classroom does not make for a smooth transition. The participants on all sides have found ways to work around the inconvenience, but in order to more closely align the participants needs and desires for videoconferencing, another room is necessary. Again, this is consistent with Acker and McCain 's (1992) suggestions dealing with the conceptual areas of room and facility design. Values are imbued and embedded in a particular setting. Implicitly, the double duty of this television classroom in Columbus lends a feeling of cheapness to the process, possibly what some students reported as not getting their money's worth.

3) **Audio upgrade**

Whether or not another room is available, an upgrading of the sound system I believe is still desirable. Even though most participants found the sound system well within their limits of toleration, the added effort displayed in turn-taking, the opening routines of reassurances, and the practice of looking to the
control room making the staff aware of their trying to communicate indicates a need to make a more efficient sound transition between Columbus and Wooster.

Stanley and Muchow (1986) outline the importance and effectiveness of quality audioconferencing, regardless of the visual accompaniment. The regular problems with feedback, poor audio levels, and the need to repeat many of the questions and comments would be eliminated. The management's decision to spend the 15,000 dollars, if the money becomes available, on a new Shure audio management system is a sound investment into the future quality of this overall videoconferencing system. This is not to say that this study suggests that the first 15,000 to become available ought to be spent on the audio, but in the long-run, this is still a needed improvement.

4) Seating
Fourth, the seating should be arranged in such a way as to allow everyone a fairly equal view of the new monitor. Keeping a row and column arrangement in either of the rooms defeats the rationale for having a larger screen to a degree. This probably means providing a platform so chairs can be raised slightly above the one in front of it and arranging the seats in some type of semi-circular or amphitheater type design. Because of the size of several of the videoconferencing classes (there is at least one undergraduate course taught yearly that utilizes the network with over 50 students).

5) Camera/source upgrades
Finally, the last recommendation for this setting that requires some kind of capital outlay is for the cameras. The reports from the technicians at the Wooster indicate that the tube cameras in Wooster are fading. The color rendition and the resolution the cameras are able to produce are falling off. If a larger monitor were to be used, then the cameras would show a more glaring problem with these visual characteristics. Another suggestion in terms of source upgrades is in a slide projection unit that transfers an image directly as an NTSC composite source as opposed to having cameras shoot images of an already projected slide. Because of the heavy use of transparencies in the seminar course, this is one alternative that would drastically improve the clarity of televised slides.

As stated at the beginning of this section, one improvement often leads to another or is dependent upon another being implemented. The way to have a large screen is to have a larger room that accommodates all the people, the monitor, and any other audio/visual equipment that may be used in a presentation. To have a better room implies needing a more advanced sound system. There is a potential for administering many of these suggestions in the current room as it presently exists, but possibly the best way to accommodate this process is to begin with an all new room.

Cost-free (monetarily) suggestions

If cost precludes any or all of the previous suggestions, there are a number of items the participants and myself believe can be done to improve the system
that do not carry any significant financial cost with them. These suggestions are organized in the order of areas of interest in the dissertation of time utilization, lighting, staging, audio management, shot selection, turn-taking, and camera-monitor-subject relationships, as well as the additional issues of visual bias, affect, and presence.

1) **Time utilization**

More fundamentally different than any equipment or personnel changes are suggestions as to how to use what is already in place. The method of using the videoconferencing as a one-way conduit of information is cost defeating. Both of the courses I studied could have been taught just as easily with one-way video and two-way audio. This may be a moot point for the College since there is a trade that offsets broadcast time and doesn’t involve real dollars. But even in terms of saving equipment expense and maintenance, there was little need to have the full two-way audio and video.

The students were desirous of having more opportunities for interaction in the videoconferenced courses. One would not need to eliminate the full two-way functions if a shift in philosophy were adopted by those facilitating the courses. Encouraging less structured and more discussion-oriented presentations would be one way to make use of the expense currently being employed by the college. If the time and energy has already been expended to create the current system to facilitate interaction, why not have interaction?

2) **Lighting**

Probably one of the simplest suggestions is to maintain a regular schedule of setting the color renditions on the monitors and the white balance on the cameras. Participants did not see inherent flaws in the current lighting system of fluorescent overhead lights, but this simple routine would improve the rendition of the subjects on the monitors. As opposed to using fluorescent lights, a diffused white light source (5300° K or so) or yellow light source (3200° K or 3400° K) diffused above and slightly to the front of the subjects being broadcast would help shift colors to a more easily balanced level and would help reduce the tendency for displaying dark eye sockets and heavy shadows under the nose.

3) **Staging**

As stated earlier, arranging chairs in such a way as to allow participants a chance to not only view the monitors but to see one another would be a benefit. In the courses I studied, there was never a need for 40 chairs. Removing the unnecessary chairs is one way to encourage participants to sit together and to sit in an arrangement conducive to effective camera shot selection. Having participants ending up sitting in three bunches around the three monitors does not allow for a sense of community.

The obvious problem with this is that someone must take responsibility for seeing that chairs are moved, added, and removed from the current rooms in Columbus and Wooster. However, the advantages this may create may outweigh
the negative aspects. There is also the potential to require students who enter the room to bring in a chair if they are physically capable. Though this has an obvious down side of placing an added burden onto the students who are already coming into a unique situation.

4) **Audio Management**

The only suggestion that arose under this topic that is not cost related is closer monitoring of classroom activities by the attending technicians/ producers. Since the levels are controlled manually at this point in time, making sure that the technician is listening and watching both sides of the link would be in order. However, the technicians outlined clearly that they have multiple responsibilities and the classes fall low on that priority list.

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These source of these suggestions can be more thoroughly traced in the complete dissertation document, but these summarize the major suggestions from all of the participants considered in balance. Faculty, staff, and students are not always in agreement with the direction of any one instructional intervention. These suggestions are an attempt to consider the relative positions of each of the individuals. With the context in mind, these recommendations ought to help facilitate a more productive and effective use of the 2-way instructional videoconferencing system.
Figure 1--Caption

This is an overhead sketch of the facility at Kottman Hall, room 244 named the Television Classroom. This was the location for the majority of the researcher's time in the instructional videoconferenced courses.
This overhead sketch of Fisher Auditorium Television Classroom illustrates the very different arrangement of space, students desks, and video production equipment. This was the origination site (place where instructor/lecturer was speaking) for most of the videoconferences studied.
Figure 2
Executive Summary

Uncovering Presence: What adult participants say enhances instructional videoconferencing.

Michael E. Ellis

Abstract

The College of Agriculture's students, faculty, and staff were the subjects of an in-depth study relating to the use and perceptions of the 2-way videoconferencing link between the Columbus and Wooster campuses. Described here is a brief summary of the methods and the resulting suggestions as they related to this mediated system of instruction.

The Method

The philosophy and methodology of this study was one of context and action. The researcher attempted to allow participants' thoughts and feelings concerning instructional videoconferencing to be revealed in the midst of a broad context of important factors. The hope was these thoughts and feelings would lead toward improving the instructional videoconferencing system. Consequently, the methods used in this study were ethnographic and naturalistic with an eye toward change.

Two courses were used as the primary data collection sites during the spring quarter 1993, one of which served as the site for field tests (fall quarter 1992) and the pilot study (winter quarter 1993). The researcher participated in a total of four sections of courses delivered over the videoconferencing link. These four sections of these two courses proved to be a rich resource for this project.

Participants were interviewed in focus groups, face-to-face (one-to-one), and casually in conversations; observed from the perspective of a fellow participant; and finally, observed in retrospect on videotape. Using multiple strategies was considered an important step in ensuring the validity and usefulness of the data collected. Through this approach, the final dissertation was an analysis of the comments, actions, and context which lead to the following series of suggestions.

The Recommendations

Practical Suggestions for Improvement

Resource-related improvements

The difficulty with making suggestions for improvement based on resources available is that one improvement may be tied or dependent upon another also being implemented. If the College of Agriculture had enlisted the help of telecommunications and education consultants at the outset, there is a possibility that these suggestions would not be necessary today. But the fact remains, there are a lot of improvements the College can make if they can afford the expense. The following suggestions are listed in order of priority as they emerged from the participants and my involvement with the videoconferencing system.

1) Larger monitors

Clearly, from the comments made by the diversity of participants, the major concern of these groups related to the visual components of the courses. Students wanted more time to view certain graphic details, they desired a more attention grabbing atmosphere. The instructors were not as much in agreement with the attention grabbing part as they were interested in seeing more detail. All the instructors and students felt the first improvement to be made to the videoconferencing classrooms is to include a single, large screen monitor as the only viewing medium.
After some thought and reading, I am in agreement with the participants’ suggestions. The consensus of their opinion, and the work by Bretz (1983), some of my own work (Ellis, 1992b), and the recent practical articles by authors such as Lund and Warren (1992) suggest that a large screen is an appropriate device as long as the screen is not too large and the seats are not too close to the viewing screen.

2) Room changes
Secondly, the participants felt that the arrangement of the room, at least in Columbus, needed to be such that it did not distract from the course. They desired more space for the students and instructors that would accommodate interaction among participants and better viewing angles to the monitor. This implies that other facilities be located that could operate as a video classroom and only as a classroom. The sharing of duties for Kottman 244 as a production/classroom does not make for a smooth transition. The participants on all sides have found ways to work around the inconvenience, but in order to more closely align the participants needs and desires for videoconferencing, another room is necessary. Again, this is consistent with Acker and McCain’s (1992) suggestions dealing with the conceptual areas of room and facility design. Values are imbued and embedded in a particular setting. Implicitly, the double duty of this television classroom in Columbus lends a feeling of cheapness to the process, possibly what some students reported as not getting their money’s worth.

3) Audio upgrade
Whether or not another room is available, an upgrading of the sound system I believe is still desirable. Even though most participants found the sound system well within their limits of toleration, the added effort displayed in turn-taking, the opening routines of reassurances, and the practice of looking to the control room making the staff aware of their trying to communicate indicates a need to make a more efficient sound transition between Columbus and Wooster.

Stanley and Muchow (1986) outline the importance and effectiveness of quality audioconferencing, regardless of the visual accompaniment. The regular problems with feedback, poor audio levels, and the need to repeat many of the questions and comments would be eliminated. The management’s decision to spend the 15,000 dollars, if the money becomes available, on a new Shure audio management system is a sound investment into the future quality of this overall videoconferencing system. This is not to say that this study suggests that the first 15,000 to become available ought to be spent on the audio, but in the long run, this is still a needed improvement.

4) Seating
Fourth, the seating should be arranged in such a way as to allow everyone a fairly equal view of the new monitor. Keeping a row and column arrangement in either of the rooms defeats the rationale for having a larger screen to a degree. This probably means providing a platform so chairs can be raised slightly above the one in front of it and arranging the seats in some type of semi-circular or amphitheater type design. Because of the size of several of the videoconferencing classes (there is at least one undergraduate course taught yearly that utilizes the network with over 50 students).

5) Camera/source upgrades
Finally, the last recommendation for this setting that requires some kind of capital outlay is for the cameras. The reports from the technicians at the Wooster indicate that the tube cameras in Wooster are fading. The color rendition and the resolution the cameras are able to produce are falling off. If a larger monitor were to be used, then the cameras would show a more glaring problem with these visual characteristics. Another suggestion in terms of source upgrades is in a slide projection unit that transfers an image directly as an NTSC composite source as opposed to having cameras shoot images of an already projected slide. Because of the heavy use of transparencies in the seminar course, this is one alternative that would drastically improve the clarity of televised slides.
As stated at the beginning of this section, one improvement often leads to another or is dependent upon another being implemented. The way to have a large screen is to have a larger room that accommodates all the people, the monitor, and any other audio/visual equipment that may be used in a presentation. To have a better room implies needing a more advanced sound system. There is a potential for administering many of these suggestions in the current room as it presently exists, but possibly the best way to accommodate this process is to begin with an all new room.

Cost-free (monetarily) suggestions

If cost precludes any or all of the previous suggestions, there are a number of items the participants and myself believe can be done to improve the system that do not carry any significant financial cost with them. These suggestions are organized in the order of areas of interest in the dissertation of time utilization, lighting, staging, audio management, shot selection, turn-taking, and camera-monitor-subject relationships, as well as the additional issues of visual bias, affect, and presence.

1) Time utilization

More fundamentally different than any equipment or personnel changes are suggestions as to how to use what is already in place. The method of using the videoconferencing as a one-way conduit of information is cost defeating. If it were not for the fact that one of the courses alternated origination points from week to week, both of the courses I studied could have been taught just as easily with one-way video and two-way audio. This may be a moot point for the College since there is a trade that offsets broadcast time and doesn't appear to involve real dollars. But even in terms of saving equipment expense and maintenance, there was little need to have the full two-way audio and video.

The students were desirous of having more opportunities for interaction in the videoconferenced courses. One would not need to eliminate the full two-way functions if a shift in philosophy were adopted by those facilitating the courses. Encouraging fewer one-way lectures and more discussion-oriented presentations would be one way to make use of the expense currently being employed by the college. If the time and energy has already been expended to create the current system to facilitate interaction, why not have interaction?

2) Lighting

Probably one of the simplest suggestions is to maintain a regular schedule of setting the color renditions on the monitors and the white balance on the cameras. Participants did not see inherent flaws in the current lighting system of fluorescent overhead lights, but this simple routine would improve the rendition of the subjects on the monitors. As opposed to using fluorescent lights, a diffused white light source (5300° K or so) or yellow light source (3200° K or 3400° K) diffused above and slightly to the front of the subjects being broadcast would help shift colors to a more easily balanced level and would help reduce the tendency for displaying dark eye sockets and heavy shadows under the nose.

3) Staging

As stated earlier, arranging chairs in such a way as to allow participants a chance to not only view the monitors but to see one another would be a benefit. In the courses I studied, there was never a need for 40 chairs. Removing the unnecessary chairs is one way to encourage participants to sit together and to sit in an arrangement conducive to effective camera shot selection. Having participants ending up sitting in three bunches around the three monitors does not allow for a sense of community.

The obvious problem with this is that someone must take responsibility for seeing that chairs are moved, added, and removed from the current rooms in Columbus and Wooster. However, the advantages this may create may outweigh the negative aspects. There is also the
potential to require students who enter the room to bring in a chair if they are physically capable. Though this has an obvious down side of placing an added burden onto the students who are already coming into a unique situation.

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